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COLOUR INDEX

Third Edition

Volume 2

THE SOCIETY OF DYERS AND COLOURISTS

AMERICAN ASSOCIATION OF TEXTILE
CHEMISTS AND COLORISTS

COLOUR INDEX

THIRD EDITION

VOLUME

2

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Science

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DEVELOPERS

Many dyes after being applied to a substrate may be diazotised and then developed with a 'coupling component' thus increasing the molecular size via an azo group linkage. This technique is applicable to many direct dyes and to certain disperse dyes, the former primarily on cellulosic fibres and the latter on the hydrophobic fibres such as cellulose acetate. The coupling components when used for this purpose are generally referred to as 'Developers'.

There are a number of dyes, both direct and disperse, which by reason of low fastness are of no value in the undeveloped state. These dyes are specially designed for diazotisation and development and their application is to be regarded as complete only after they have been so developed on the substrate.

This section brings together under their commercial names those compounds which are in general use and records, where known, their chemical constitution along with brief notes on solubility and general usage characteristics.

The information on chemical constitution is, where necessary, given in two forms. Firstly the name under which it is most widely known in relation to the colouring of textiles and secondly, within brackets, the name which conforms to the system of chemical nomenclature used in Volume 4.

Some developers are chemically identical with certain C.I. Azoic Coupling or Diazo Components or C.I. Oxidation Bases and such cases are indicated by a cross reference.

C.I. Developers 1—8

C.I. Developer	CONSTITUTION	SOLUBILITY	USAGE
1	Phenylmethylpyrazolone (3-methyl-1-phenyl-5-pyrazolone)	Soluble in hot water	Developing diazotised direct dyes, particularly for yellows, yellowish oranges and greens
2	Phenol	Soluble in hot water and in aq. sodium hydroxide	Mainly for reds with Primuline-type direct dyes, see C.I. Direct Yellow 59
3	Gamma acid (7-Amino-1-naphthol-3-sulphonic acid)	Soluble in hot water and in aq. sodium hydroxide	Developing diazotised direct dyes, particularly for yellows and oranges
4	C.I. 76505 Resorcine (Resorcinol)	Soluble in hot water	Mainly for dull reddish oranges with Primuline-type direct dyes, see C.I. Direct Yellow 59 See also C.I. Oxidation Base 31
5	C.I. 37500 β -Naphthol (2-Naphthol)	Soluble in aq. sodium hydroxide	Gives the widest colour range of all developers and is used for all hues except yellow. Used on leather for navies and blacks
5:1	C.I. 37500	Soluble in hot water	As for C.I. Developer 5
6	2-Hydroxy-1-naphthoic acid (1-Carboxy-2-naphthol)	Soluble in hot water and in aq. sodium hydroxide	As for C.I. Developer 5, but particularly for developing direct dyes in presence of acetate
7	C.I. 76605 α -Naphthol (1-Naphthol)	Soluble in hot water and in aq. sodium hydroxide	Developing diazotised direct dyes, particularly for reds, bordeaux, blues and blacks
8	β -oxynaphthoic acid, B.O.N.A. (3-Hydroxy-2-naphthoic acid)	Soluble in aq. sodium hydroxide. (Some brands are water-sol.)	Developing diazotised disperse dyes on acetate, polyester and triacetate, particularly for blues, navies and blacks

C. I. Developers 9—21

C.I. Developer	CONSTITUTION	SOLUBILITY	USAGE
9	<i>m</i> -Diethylaminoacetanilide	Soluble in dil. hydrochloric acid	With C.I. Disperse Blue 11 for navies on acetate. Also for bluish reds to bordeaux with other suitable disperse dyes on acetate Literature BP 523287
10	a tertiary arylamine	Soluble in dil. hydrochloric acid	As for C.I. Developer 9 Literature BP 506740, USP 2196984
11	C.I. 76025 <i>n</i> -Phenylenediamine	Soluble in water and in aq. sodium hydroxide	Developing diazotised direct dyes to blacks, blues and browns
12	C.I. 76025 hydrochloride 4-Chloro- <i>m</i> -phenylenediamine hydrochloride	Soluble in hot dil. hydrochloric acid	Developing diazotised direct dyes to black See also C.I. Oxidation Base 12
13	C.I. 76060 <i>p</i> -Phenylenediamine	Soluble in warm water and in dil. hydrochloric acid	Developing diazotised direct dyes to black and browns See C.I. Oxidation Base 10
14	C.I. 76035 <i>m</i> -Toluylenediamine (Toluene-2,4-diamine)	Soluble in hot water and in aq. sodium carbonate	Developing diazotised direct dyes, particularly to blacks, dark blues and browns. Used on leather for navies and blacks See C.I. Oxidation Base 20
15	C.I. 76085 <i>p</i> -Aminodiphenylamine (<i>N</i> -phenyl- <i>p</i> -phenylenediamine)	Soluble in warm water and in dil. hydrochloric acid	Developing diazotised direct dyes, particularly to blacks See C.I. Oxidation Base 2
16	<i>N</i> -Ethyl- β -naphthylamine (<i>N</i> -Ethyl-2-naphthylamine)	Soluble in warm water and in dil. hydrochloric acid	Developing diazotised direct dyes to blacks
17	C.I. 37035 (<i>p</i> -Nitroaniline)	Soluble in boiling water and in hydrochloric acid	Diazotised and coupled to certain direct dyes See also C.I. Azoic Diazo Component 37
18		Very slightly soluble in water, used as a dispersion	To develop C.I. Disperse Black 1 on polyester to deep brown. Fastness on polyester (ISO):—Hot pressing, wet 5, dry 5; light 5–6; washing (60°C) 5, 5, 5W
19	Phloroglucinol (1,3,5-Benzenetriol)	Very soluble in water	To develop diazo disperse blacks on acetate Literature USP 2546861
20	This C.I. Generic Name is discontinued, for information previously listed under it see C.I. Developer 8		
21	C.I. 37520 (3-Hydroxy-2-naphth- <i>o</i> -toluidide)	Insoluble	For developing diazo disperse dyes on polyester to blacks and navies. Applied simultaneously with dye by high temperature or carrier dyeing, then final hue produced by treatment with acid sodium nitrite See C.I. Azoic Coupling Component 18

C.I. Developers 22—26

C.I. Developer	CONSTITUTION	SOLUBILITY	USAGE
22	C.I. 37530 (3-Hydroxy-2-naphth-o-anisidide)	Insoluble	For disperse dyes on polyester See C.I. Azoic Coupling Component 20
23	C.I. 37565 (3-Hydroxy-2-naphth-o-naphthamide)		See C.I. Azoic Coupling Component 7
24	This C.I. Generic Name is discontinued, the products formerly listed are mixtures		
25	This C.I. Generic Name is discontinued, the products formerly listed are mixtures		
26	<i>m</i> -Dimethylamino-acetanilide	Insoluble	For developing C.I. Disperse Blue 11 on acetate and triacetate to navy redder than that obtained with C.I. Developer 9

NOTES

NOTES

DIRECT DYES

The dyes within this section are those which were originally designed and marketed for the primary purpose of dyeing cotton and are defined by the Society's Terms and Definitions Committee as 'Anionic dyes substantive to cellulose when applied from an aqueous bath containing an electrolyte.' They provide the simplest means of colouring cellulosic materials since they are normally applied from a neutral or slightly alkaline bath, at or near the boil, to which sodium chloride or sulphate is added in such quantities and at such intervals of time appropriate to the dyeing properties of individual dyes.

The majority of direct dyes belong to the Dis-, Tris- and Polyazo classes, the remainder being Monoazo, Stilbene, Oxazine, Thiazole and Phthalocyanine compounds.

Some direct dyes have extensive use other than on cellulose fibres, many being of outstanding importance for use on paper, leather, wool, silk, nylon, bast fibres and for many miscellaneous purposes such as preparation of heavy-metal salts for use as pigments, biological stains, indicators, etc.

In presenting data on direct dyes, it has been necessary to select those properties and characteristics most likely to give maximum guidance in the selection of dyes for particular purposes. In most cases emphasis is placed on application to cellulose fibres on which direct dyes provide a wide range of hues of poor to moderate fastness, to wet treatment and poor to very good fastness to light. Study of the history of the development of direct dyes shows that from 1884 when the first dye directly substantive to cellulose, Congo Red (C.I. Direct Red 28), was discovered the two chief objectives have been to obtain dyes having improved fastness to wet treatment and to light. These objectives were first attained by use of various aftertreatments of the dyeings and these are still the principal methods for obtaining a reasonably good standard of fastness to wet treatment. Improvement in fastness to light has been largely obtained by modification of the dye molecule and direct dyes are now available which, particularly in deep dyeings, have very good fastness to light.

Direct dyes fall into the following groups:

- (a) Dyes of average fastness properties, some being suitable for one or more of the aftertreatments detailed in *c*, *d*, *e* and *f* below
- (b) Dyes of better fastness to light and conveniently classed as 'fast-to-light' direct dyes.
- (c) Dyes designed specially for development on the fibre to more complex dyes through diazotisation and coupling, see C.I. Developers p. 2001
- (d) Dyes designed specially for development on the fibre to more complex dyes by coupling with diazotised *p*-nitroaniline (C.I. Developer 17)
- (e) Dyes designed specially for aftertreatment on the fibre with salts of metals capable of coordination, usually copper or chromium salts, to form metal complexes
- (f) Designed specially for aftertreatment on the fibre with formaldehyde.

Dyes within groups *c*, *d*, *e* and *f* are not normally used without subsequent aftertreatment.

It is also common practice to aftertreat direct dyeings with cationic dye-complexing agents to improve fastness to wet

treatment but this is usually accompanied by lowering of the fastness to light.

The data are given under the following main headings:

Application

This includes general notes on dyeing properties with particular reference to cellulose fibres and where possible gives the dyeing class according to recommendations made in the 1st and 2nd reports of the Society's Committee on the Dyeing Properties of Direct Dyes (*JSDC*, 1946 (62) 64, 145), i.e.:

- A** Dyes having good levelling or migration properties
- B** Dyes having poor levelling or migration properties but which can be dyed uniformly by means of controlled additions of salt
- C** Dyes of poor migration which require control by temperature as well as by additions of salt.

Where possible notes on dyes application for dyeing material besides cellulose are given including the behaviour when dyed on mixtures with other fibres, the degree of staining or dyeing of the other fibres in such mixtures being given.

An important feature of direct dyes is their suitability or otherwise for the aftertreatments cited in *c*, *d*, *e* and *f* above. The aftertreatments are indicated in the data by the following numbers:

1. Bichromate
2. Bichromate and copper sulphate
3. Copper sulphate
4. A copper salt and a cationic dye-fixing agent
5. A cationic dye-fixing agent
6. Formaldehyde
7. Coupling with diazotised *p*-nitroaniline (C.I. Developer 17)
8. Diazotising and then coupling with β -naphthol (C.I. Developer 5)
9. Diazotising and then coupling with *m*-toluylenediamine (C.I. Developer 14)
10. Diazotising and then coupling with phenylmethylpyrazolone (C.I. Developer 1)
11. Diazotising and then coupling with resorcinol (C.I. Developer 4)

Printing and Solubility

Some reference is made to the direct printing of direct dyes. For use for this purpose the dye must have good solubility and since this is markedly affected by presence of other substances, e.g. electrolytes, it is usually necessary to select only those brands specially manufactured for this purpose. Unfortunately there is no agreed standard method for assessing solubility and considerable variation in solubility exists between brands listed under the same C.I. Generic Name. For these reasons no reference is made in the data to solubility and readers are advised to consult the information given by the respective manufacturers.

Fastness Properties, etc.

Unless otherwise stated, the information given refers to the dye when applied to cotton. The properties listed have been selected as the "key" properties as it is impossible to record

all the properties which might be regarded as relevant to all the varied uses of direct dyes on cellulose textiles.

Dischargeability

The data given are for dyeings on cotton and unless otherwise stated refer to discharging by sodium formaldehyde sulphoxylate (C.I. Reducing Agent 2).

Effect of Metals

The information given indicates the effect on the hue when dyeing is carried out in presence of copper or iron. The effect

of using hard water is given where such information has been provided.

Non-textile Usage

The two most important non-textile uses for direct dyes are on paper and leather. In the latter case, when a dye has been suggested as suitable for leather dyeing, this is stated under non-textile usage. Those dyes having important leather usage are also included in the special Leather Dyes Section in Volume 3 of this Index.

LITERATURE

Since the introduction of the first direct dye—Congo Red in 1884, an extensive literature has been built up not only in relation to the practical application and usage of direct dyes, but also in relation to the physico-chemical factors underlying the mechanism by which direct dyes are absorbed and retained within the cellulose molecule. Much of this information has been published in the journals devoted to the application of dyes and among which the *Journal of the Society of Dyers and Colourists* goes back to 1884. The theoretical aspects underlying the application of direct dyes to cellulose have aroused considerable scientific interest and are very fully dealt with in the appropriate chapters of *The Physical Chemistry of Dyeing*, Vickerstaff, T., whose extensive lists of references covering all the more important papers and communications published on this subject in the technical journals are given.

In recent years dye manufacturers have published the results of their own investigational work in the form of graphs or tables so as to provide the practical dyer with information relative to the dyeing properties of direct dyes. Such information can be regarded as part of the current technical literature on direct dyes.

The technical journals concerned with the application of dyes contain many papers and communications covering both the theoretical and practical aspects of the problems peculiar to the dyeing of viscose rayon. This general literature is also augmented by the specialised literature made available by the dye manufacturers and also the fibre manufacturers.

Among the text books, the following list, though in no sense comprehensive, covers much of the ground:

- Horsfall, R. S., and Lawrie, L. G., *The Dyeing of Textile Fibres*, 2nd Edn. (London, Chapman & Hall, 1946)
Knecht, E., Rawson, C., and Lowenthal, R., *Manual of Dyeing* (London, Griffin, 1947)
Schaeffer, A., *Handbuch der Färberei*, Band 1 (Stuttgart, Konradin-Verlag Robert Kohlhammer, 1949)
Diserens, L., *Chemical Technology of Dyeing and Printing*, translated and revised from the 2nd German Edn by P. Wengraf and H. P. Baumann, Vol. I and II (New York, Reinhold, 1948 and 1951)
Knecht, E., and Fothergill, J. B., *The Principles and Practice of Textile Printing*, 4th Edn. Edited with additional notes by J. G. Hurst (London, Griffin, 1952)
Vickerstaff, T., *The Physical Chemistry of Dyeing*, 2nd Edn (London and Edinburgh, Oliver & Boyd, 1954)
Weber, F., and Gasser, F., *Die Praxis der Färberei* (Wien, Springer-Verlag, 1954)
Hall, A. J., *A Handbook of Textile Dyeing and Printing* (London, National Trade Press, 1955)
Lubs, H. A. (Editor), *The Chemistry of Synthetic Dyes and Pigments* (New York, Reinhold, 1955)
Cockett, S. R., and Hilton, R. A., *Dyeing Cellulosic Fibres and Related Processes* (London, Leonard Hill, 1961)
Schmidlin, H. U., *Preparation and Dyeing of Synthetic Fibres* (London, Chapman & Hall, 1963)
Wilcock, C. C., and Ashworth, J. L., *Whittaker's Dyeing with Coal-Tar Dyestuffs*, 6th Edn (London, Baillière, Tindall & Cox, 1964)
Anon., *An Introduction to Textile Printing* (London, Butterworths & ICI, 1964)
Cockett, S. R., *Dyeing and Printing* (London, Pitman, 1964)
Trotman, E. R., *Dyeing and Chemical Technology of Textile Fibres*, 3rd Edn (London, Griffin, 1964)
Cheetham, R. C., *Dyeing Fibre Blends* (London, D. van Nostrand, 1966)
Agster, A., *Färberei – und textilchemische Untersuchungen* (Berlin, Heidelberg, New York, Springer-Verlag, 1967)
Haigh, D., *Dyeing and Finishing of Knitted Goods* (Leicester, Hosiery Trade Journal, 1970)
Society of Dyers and Colourists, *Reports on the Dyeing Properties of Direct Cotton, Vat and Wool Dyes; Report of the Fastness Tests Committee* (3rd Edn); *Symposium Papers*, 1947, 1949, 1951, 1953, 1963, 1965, 1968, 1969; *Explanatory Papers on Modern Theory*, 1965 to date; *Review of Progress in Coloration and Related Topics*, 1969 to date
Society of Dyers and Colourists and The Textile Institute, *Review of Textile Progress*, Vol. 1–17, 1952–1966.

C.I. Direct Yellow	1	2	3
CHEMICAL CLASS	Disazo	Disazo	Azo-thiazole
C.I. CONSTITUTION NUMBER	22250	23640	13925
HUE: Daylight	Dull Yellow (Direct) Brownish Olive (2)	Yellow (Direct) Duller with aftertreatment (2)	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Fairly good 2, 7	Normal — — — Poor 1, 2, 3	
OTHER FIBRES Dyeing Staining	Wool and silk Wool and silk dyed as cotton Acetate stained	Wool dyed from neutral bath Wool dyed as cotton	This C.I. Generic Name is discontinued. Dyes formerly listed under it now appear under C.I. Direct Yellow 22
PRINTING	Cellulose: discharge prints, cream grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 2-3 2 4 3 4 5 1-2 — 2-3 —	ISO (2) 3 1-2 3-4 — 4-5 — 2-3 4 —	ISO Direct 1 2 4 — 4-5 — 1-2 1-2 2 2-3 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Much duller —	Very good — —	
NOTES AND NON-TEXTILE USAGE	Microscopic stain		

C.I. Direct Yellow 4-8

C.I. Direct Yellow	4	5	6
CHEMICAL CLASS	Disazo	Quinoline	Stilbene
C.I. CONSTITUTION NUMBER	24890	47035	40001
HUE: Daylight	Bright Yellow	Greenish Yellow	Bright Yellow→Reddish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good	Normal — Good — Good —	Normal B Good Good affinity cold — —
OTHER FIBRES Dyeing Staining	Nylon: with acetic acid Silk, wool and nylon dyed Acetate unstained	Wool, silk and nylon with acetic acid, see C.I. Acid Yellow 5 Wool and silk dyed as cotton Nylon dyed. Acetate slightly stained	 Silk and wool dyed lighter than cotton. Nylon stained Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 3 1 2 — 5 — 1 3 —	AATCC — — 4 — 3 — 1 1 —	AATCC ISO 1 4-5 1 4-5 4-5 4 — 2 1-2 2-3 — 3-4 (I) 2-3 3 — — 2-3 3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Unaffected —	Very good Greener and duller Much duller	Poor Unaffected Duller
NOTES AND NON-TEXTILE USAGE	Indicator: pH range 6.4-9.4 Yellow→Reddish orange Leather Paper: Beater dyeing and surface colouring Fastness on paper: Alkali, poor; Light, v.good; Water, fair Rarely used on textiles Biological stain	Paper: Leather	The heavy metal salts are used as pigments for distempers, lithographic inks, oil colours and wallpapers Paper: Beater dyeing and coatings Leather: See Leather Dyes section

6:1	7	8	C.I. Direct Yellow
Stilbene 40006	Thiazole 49010	Azo-Thiazole 13920	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Greenish Yellow	Bright Greenish Yellow	HUE: Daylight
	Normal — Good — Good —	Normal A Good — Good, particularly on viscose —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Similar in properties and usage to C.I. Direct Yellow 6	Wool and silk Wool and silk dyed as cotton, nylon heavily stained, acetate slightly stained	Wool and Silk see C.I. Acid Yellow 186 Cotton and wool dyed equal depth below 80°C. Acetate stained, nylon dyed.	OTHER FIBRES Dyeing Staining
	Direct on silk	Cellulose and silk: urea process with disodium phosphate	PRINTING
	AATCC 3 2 3 1 1 1 (I) 2 2 — ISO 2-3 4 3 1 1 1 1-2 2 —	AATCC 3 5 5 — 2 — (I) 1 1 — ISO 3-4 3-4 3-4 2 2 3 2 — 2-3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Poor Much greener Much duller	Poor Slightly redder Slightly redder	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Biological stain Leather	Paper: Beater dyeing. Heavy metal salts for coating Colouring of phenoplastic moulding powders	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 8:1-11

C.I. Direct Yellow	8:1	9	9:1																				
CHEMICAL CLASS	Azo-thiazole	Azo-thiazole	Azo-thiazole																				
C.I. CONSTITUTION NUMBER		19540																					
HUE: Daylight		Yellow	Yellow																				
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Yellow 8 but similar in properties and usage	Normal, neutral C — 80 — —	Slightly different chemically from C.I. Direct Yellow 9 but similar in properties and usage																				
OTHER FIBRES Dyeing Staining		Wool and silk as cotton. Nylon heavily stained. Acetate unstained to slightly stained																					
PRINTING		As illuminating colour in formaldehyde sulphonylate discharge prints																					
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		<table><tr><th>AATCC</th><th>ISO</th></tr><tr><td>1</td><td>2</td></tr><tr><td>1</td><td>1</td></tr><tr><td>3-4</td><td>3-4</td></tr><tr><td>—</td><td>1</td></tr><tr><td>1</td><td>1</td></tr><tr><td>—</td><td>1</td></tr><tr><td>(I) 3</td><td>2-3</td></tr><tr><td>3</td><td>2</td></tr><tr><td>—</td><td>—</td></tr></table>	AATCC	ISO	1	2	1	1	3-4	3-4	—	1	1	1	—	1	(I) 3	2-3	3	2	—	—	
AATCC	ISO																						
1	2																						
1	1																						
3-4	3-4																						
—	1																						
1	1																						
—	1																						
(I) 3	2-3																						
3	2																						
—	—																						
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Not dischargeable Little redder Unaffected																					
NOTES AND NON-TEXTILE USAGE		Biological stain Indicator: pH range 12-14 approx. Red→Yellow Leather Paper Analytical reagent (qualitative) for magnesium Fluorescent dye for microscopy																					

10	11	C.I. Direct Yellow
Monoazo 14140	Stilbene 40000†	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow (Direct) Redder on aftertreatment (2)	Reddish Yellow	HUE: Daylight
Normal — — 60–80 Fair 2	Normal B — 60–80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool and silk dyed as cotton, acetate stained	Silk and wool lighter than cotton, acetate and nylon unstained	OTHER FIBRES Dyeing Staining
		PRINTING
ISO Direct 3 2 2 3 4 4 2 — 2 —	ISO (2) 4 2 4 — 4–5 — 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor Redder Redder and duller	Poor Greener Much redder and duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Heavy metal salts used for paints, inks and lacquers Leather: see Leather dyes section Paper: for dyeing and surface coating †The dyes listed under this C.I. Generic Name are all very similar in constitution and correspond collectively to C.I. 40000. The exact constitutions are indeterminate Biological stain	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 12-16

C.I. Direct Yellow	12	13
CHEMICAL CLASS	Disazo	Disazo
C.I. CONSTITUTION NUMBER	24895	25325
HUE: Daylight	Reddish Yellow	Dull Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 40 — —	Normal — — — — —
OTHER FIBRES Dyeing Staining	Wool: with Glauber's salt or acetic acid Silk: neutral or with acetic acid Nylon: with acetic acid or ammonium tartrate Silk and wool dyed as cotton. Acetate slightly stained, nylon dyed	
PRINTING	Cellulose: urea process Nylon: with ammonium tartrate	
FASTNESS PROPERTIES Method	AATCC	ISO
Acid (organic)	2	3
Alkali	2-3	4-5
Hot pressing	5	3-4
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	3-4
normal	4-5	4
2 × normal	—	4
Washing — alteration	(I) 1	1
staining	—	1-2
Water — alteration	1	—
staining	—	—
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose: fair-good Silk: good-very good Nylon: (zinc formaldehyde-sulphoxylate) fair-fairly good Practically unaffected Practically unaffected	Fair
NOTES AND NON-TEXTILE USAGE	Garment dyeing Stable to anticrease finishes Heavy metal salts used for pigments in paper coating Leather: see Leather dyes section Paper: Beater dyeing. Fastness properties good Biological stain Fastness on Nylon (AATCC) Hot pressing 2-3; Light 5-6; Perspiration 4-5; Washing (II) 3	

14	15	16	C.I. Direct Yellow
Azo-thiazole 18780	Disazo 25220	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellow (Direct)	Reddish Yellow	Bright Reddish Yellow	HUE: Daylight
Normal — — Good 2	Normal — — 60 Fairly good —	Normal — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool dyed equal to cotton Silk dyed lighter than cotton Acetate heavily stained	Silk and wool dyed equal to cotton. Acetate stained	Silk and wool slightly stained Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 2 2 — 2 — 2 — 2 —	ISO 2-3 3-4 4 4-5 4-5 5 2 — 2 —	AATCC 3-4 4 4 — 4 — (II) 5 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor	Good—very good Unaffected Unaffected Somewhat sensitive to hard water	Neutral—very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Fastness to light, washing and water is improved by after- treatment 2	Colouring soap		NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 16:1-21

C.I. Direct Yellow	16:1	17	18		
CHEMICAL CLASS	Polyazo	Azo-thiazole	Azo-thiazole		
C.I. CONSTITUTION NUMBER		18855	13930		
HUE: Daylight	Bright Reddish Yellow	Reddish Yellow (Direct)	Bright Greenish Yellow		
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Yellow 16 but similar in properties and usage	Normal — — Good 1, 3	Normal — 80 Very good —		
OTHER FIBRES Dyeing Staining		Wool dyed as cotton Silk dyed lighter than cotton Acetate heavily stained	Silk and wool dyed as cotton Acetate stained		
PRINTING					
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½–½ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 5 3 5 — 2-3 — 2 — 2-3 —	ISO (1) 5 3 5 — 4-5 — 3 — 3 —	ISO (3) 5 3 5 — 4-5 — 3 — 3 —	ISO 3 4 4 1 2 3 1-2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Poor	Fair—fairly good Slightly redder Unaffected Somewhat sensitive to hard water		
NOTES AND NON-TEXTILE USAGE			Paper dyeing Colouring soap		

19	20	21	C.I. Direct Yellow
Stilbene 40030	Disazo 22410	Stilbene 40045	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellow	Yellow	Yellow	HUE: Daylight
Normal — Fair — Good —	With soap and trisodium phosphate — Good — Poor —	Normal — 20–40 Moderate —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed as cotton Acetate slightly stained, nylon heavily stained	Silk and wool: neutral Nylon: neutral Silk and wool dyed as cotton Acetate slightly stained, nylon dyed	Wool unstained at 40°C, stained at 80–100°C	OTHER FIBRES Dyeing Staining
Cellulose and silk: Direct styles			PRINTING
AATCC 5 1 5 — 3 — (I) 3 — 1 —	AATCC 2 2 4 — 3 — (I) 2 — 4 —	ISO 3 2 2–3 — 3 — 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor Unaffected Redder	Cellulose: good Silk: very good Much redder Duller	Poor	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather Fastness on nylon: Light, good; washing, fair		NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 22-26

C.I. Direct Yellow	22	23
CHEMICAL CLASS	Azo-thiazole	Stilbene
C.I. CONSTITUTION NUMBER	13925	
HUE: Daylight	Greenish Yellow (Direct)†	Dull Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Very good 3	Normal — Good — Good —
OTHER FIBRES Dyeing Staining	 Silk dyed heavier than cotton Wool dyed lighter than cotton Acetate stained	 Silk and wool unstained at low temp., dyed lighter than cotton at 80-100°C. Acetate unstained, nylon slightly stained
PRINTING		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 3 4 2-3 — 1 — 2-3 — 2-3 —	ISO (3) 3-4 4 3 — 2-3 — 3 — 3 —
		AATCC 5 1 5 — 1 — (1) 4-5 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Poor Slightly affected Unaffected	Poor Redder Unaffected
NOTES AND NON-TEXTILE USAGE	†Becomes redder on aftertreatment with copper sulphate (3)	Leather Paper

24	25	26	C.I. Direct Yellow
Disazo 22010	Disazo 21510	Disazo 25300	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Yellow	Reddish Yellow	Yellow	HUE: Daylight
Normal B —	Normal C —	With soap and sodium phosphate — Good 40–60 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed as cotton Acetate stained	Silk Silk dyed lighter than cotton Wool dyed as cotton Acetate stained	Silk and wool dyed as cotton Acetate slightly stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 3–4 2–3 4 1–2 1–2 2 2 —	ISO 4 4 — 1 1 1 2 3 —	AATCC 3 2 4 3 4 5 (I) 1 — 1–2 —	ISO 3 3 4 4 4–5 5 2 — 2–3 —
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Fairly good	Very good	Cellulose: very good Silk: good Greener and duller Redder and duller Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Fastness on nylon: Light 4; Washing 4 Leather: See Leather Dyes section Paper: Beater dyeing Biological stain	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 27-30

C.I. Direct Yellow	27	28																																												
CHEMICAL CLASS	Monoazo	Thiazole																																												
C.I. CONSTITUTION NUMBER	13950	19555†																																												
HUE: Daylight	Bright Greenish Yellow	Reddish Yellow																																												
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Fair 25–40 — —	Normal C Good 80 — —																																												
OTHER FIBRES Dyeing Staining	Wool: Glauber's salt and ammonium acetate Silk: Glauber's salt and acetic acid Nylon: Formic acid Silk and wool dyed as cotton Nylon dyed	 Silk and wool much lighter than cotton, acetate unstained, nylon heavily stained																																												
PRINTING	Cellulose: urea process	Cellulose: urea process with disodium orthophosphate for direct printing and as an illuminating colour in discharges																																												
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½–½ normal normal 2 × normal Washing — alteration staining Water — alteration staining	<table><tr><th>AATCC</th><th>ISO</th></tr><tr><td>5</td><td>3–4</td></tr><tr><td>5</td><td>5</td></tr><tr><td>5</td><td>4</td></tr><tr><td>—</td><td>4–5</td></tr><tr><td>5</td><td>5</td></tr><tr><td>—</td><td>5–6</td></tr><tr><td>(I) 1</td><td>1–2</td></tr><tr><td>—</td><td>—</td></tr><tr><td>1</td><td>1–2</td></tr><tr><td>—</td><td>—</td></tr></table>	AATCC	ISO	5	3–4	5	5	5	4	—	4–5	5	5	—	5–6	(I) 1	1–2	—	—	1	1–2	—	—	<table><tr><th>AATCC</th><th>ISO</th></tr><tr><td>5</td><td>5</td></tr><tr><td>4</td><td>5</td></tr><tr><td>5</td><td>4</td></tr><tr><td>—</td><td>5</td></tr><tr><td>4–5</td><td>6</td></tr><tr><td>—</td><td>6</td></tr><tr><td>(I) 4–5</td><td>3–4</td></tr><tr><td>—</td><td>—</td></tr><tr><td>3–4</td><td>3–4</td></tr><tr><td>—</td><td>—</td></tr></table> Stable to chlorine	AATCC	ISO	5	5	4	5	5	4	—	5	4–5	6	—	6	(I) 4–5	3–4	—	—	3–4	3–4	—	—
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OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fair—very good Unaffected Redder and duller	Not dischargeable Little greener Little redder																																												
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn Leather Paper: beater dyeing	†The dyes listed under this C.I. Generic Name vary somewhat in constitution but correspond collectively to C.I. 19555. Shading of sulphur dyeings Fastness on paper: NaOH, v. good; H ₂ SO ₄ , v. good; Light, good; water, v. good. Leather: see Leather Dyes section Paper: beater dyeing and occasionally for coating Fluorescent dye for microscopy																																												

29	30	C.I. Direct Yellow
Thiazole 19556†	Thiazole 19555 and 19556†	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow	Dull Reddish Yellow	HUE: Daylight
Normal C Good 100 — —	Normal B —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool much lighter than cotton. Acetate unstained, nylon heavily stained	Silk and wool dyed as cotton Acetate stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium ortho-phosphate for direct prints and as illuminating colour in discharge styles		PRINTING
AATCC 5 4 5 — 4-5 — (I) 4-5 — 3-4 — Stable to chlorine	ISO 5 4-5 — 4 5 5-6 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Not dischargeable Practically unaffected Practically unaffected	Not dischargeable	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
†The dyes listed under this C.I. Generic Name vary somewhat in constitution but correspond collectively to C.I. 19556. Shading of sulphur dyeings Fastness on paper: NaOH, v. good; H ₂ SO ₄ , v. good; Light, good; water, v. good Leather: see Leather Dyes section Paper: beater dyeing and occasionally for coating	†The dye originally listed under this C.I. Generic Name was a combination of C.I. 19555 and C.I. 19556	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 31-35

C.I. Direct Yellow	31	32
CHEMICAL CLASS	Azo	Disazo
C.I. CONSTITUTION NUMBER		
HUE: Daylight	Bright Yellow	Bright Yellow (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A —	Normal C — — — 3, 4
OTHER FIBRES Dyeing		
Staining	Silk and wool dyed as cotton Acetate stained, nylon dyed	Silk and wool lighter than cotton Acetate stained
PRINTING	Cellulose: urea process with disodium phosphate Wool and silk: suitable	Cellulose: urea process with disodium orthophosphate and a solubilising agent
FASTNESS PROPERTIES Method	ISO	AATCC Direct AATCC (3) ISO Direct ISO (3) ISO (4)
Acid (organic)	4	3 2 3 2 —
Alkali	3-4	3 3 2-3 3 —
Hot pressing	4-5	5 5 4 3 —
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	5	— — 4 4 —
normal	5-6	4 4 4 4 5
2 × normal	5-6	— — 4 4 —
Washing — alteration	3-4	(II) 3 (III) 4 4 4 4-5
staining	—	— — — — —
Water — alteration	2	3 5 3-4 4-5 4-5
staining	—	— — — — —
OTHER PROPERTIES Dischargeability	Very good	Neutral and alkaline: good-very good
Effect of metals — Copper Iron	Unaffected Unaffected	Somewhat affected —
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn Paper dyeing	Paper dyeing

33	34	35	C.I. Direct Yellow	
Disazo 29020	Disazo 29060	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
†Reddish Yellow (Direct)	Reddish Yellow	Reddish Yellow	HUE: Daylight	
Normal — — 60 Moderate 3	Normal — Slow 70 Moderate 5	Normal B — Below 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Silk: suitable on unweighted and weighted Silk and wool lighter than cotton Acetate unstained	Acetate and triacetate re- served	Silk slightly stained, wool slightly stained at 40°C, dyed as cotton at 80°C	OTHER FIBRES Dyeing Staining	
			PRINTING	
ISO Direct 3 4 5 5-6 6 6-7 3-4 — 3 —	ISO (3) 3 2-3 4 5-6 6-7 6-7 4 — 4-5 —	AATCC 4-5 3 5 — 5 — 3-4 3 — —	ISO 3 5 3-4 4-5 5-6 6-7 2-3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: poor-moderate Unaffected Unaffected, greener and weaker when aftertreated	Neutral: good Alkaline: moderate-poor	Very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
†Becomes somewhat duller on aftertreatment with cop- per sulphate Paper dyeing Inks (aqueous)	Paper: beater dyeing Fastness properties: caustic soda, fair-poor; sulphuric acid, fair; light, fair; water, fair; sodium hypochlorite, good	Anodised aluminium	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Yellow 36-39

C.I. Direct Yellow	36	37
CHEMICAL CLASS		
C.I. CONSTITUTION NUMBER		
HUE: Daylight	Bright Greenish Yellow	Reddish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good —	Normal, salt sensitive — — — Very good, control with salt —
OTHER FIBRES Dyeing Staining		Silk slightly stained at 80°C Wool almost unstained at 40°C and lighter than cotton at 80°C. Acetate unstained
PRINTING		Cellulose: urea process with disodium phosphate Silk and wool: suitable
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4-5 4 3 — 5-6 — 3 — 2-3 —	ISO 4 3 4 5 6 6 3 — 1-2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good — —	Neutral: very good Alkaline: good—very good Suitable for dischargeable grounds Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE		

38	39	C.I. Direct Yellow
	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow	Bright Yellow (Direct)†	HUE: Daylight
Normal, salt sensitive — — — Very good, control with salt —	Normal B Good 80°C — 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk slightly stained at 80°C Wool almost unstained at 40°C and lighter than cotton at 80°C. Acetate unstained	Silk and wool lighter than cotton Acetate and nylon unstained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium phosphate Silk and wool: suitable	Cellulose: urea process with disodium ortho-phosphate Concentrated brands preferable	PRINTING
ISO 4-5 3 4-5 5-6 6-7 7 4 — 2-3 —	AATCC Direct 3-4 2 5 — 6-7 — (II) 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good Suitable for dischargeable grounds Unaffected Unaffected	Neutral and alkaline: fair Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section	†Hue somewhat duller on aftertreatment Paper Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 40-44

C.I. Direct Yellow	40	41				
CHEMICAL CLASS		Disazo				
C.I. CONSTITUTION NUMBER		29005				
HUE: Daylight	Yellow (Direct)†	Reddish Yellow				
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — 60 — 4	Normal C Good 60 — —				
OTHER FIBRES Dyeing Staining	 Silk and wool much lighter than cotton Acetate unstained	Silk: neutral Silk and wool dyed as cotton Acetate stained, nylon dyed				
PRINTING	Viscose rayon: by urea process Concentrated brands preferable	Cellulose and silk: urea process with disodium orthophosphate Nylon: with ammonium tartrate				
FASTNESS PROPERTIES Method	AATCC Direct 4 3 3-4 — 4-5 — (III) 2-3 — 3-4 —	AATCC (4) — — 5 — 5 — (III) 3-4 — 5 —	ISO Direct 4 3 4 4 5 5 4 — 3-4 —	ISO (4) 5 5 4 4 5 5-6 4-5 — 5 —	AATCC 5 5 5 3 4 5 (I) 1 — 3 —	ISO 3 4 3 4-5 5 5-6 2-3 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral, alkaline: very good Aftertreated, alkaline in presence of anthraquinone: very good Unaffected Slightly affected	Neutral: good Alkaline: fairly good Practically unaffected Slightly redder				
NOTES AND NON-TEXTILE USAGE	†Hue somewhat duller on aftertreatment Covers irregular quality viscose yarn Leather	Covers irregular quality viscose yarn Paper				

42	43	44	C.I. Direct Yellow
Disazo 29010		Disazo 29000†	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow	Reddish Yellow→Yellowish Orange	Bright Yellow	HUE: Daylight
Normal — — 60–80 Very good —	Normal B — 60–80 — —	Normal A — 40–60 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool dyed as cotton Acetate stained	Wool stained Acetate unstained	Silk: neutral Nylon: neutral or by padding, with ammonium tartrate Silk and wool dyed as cotton Acetate stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
		Nylon: very suitable, using ammonium tartrate	PRINTING
ISO 3–4 4 3–4 4–5 5 5–6 3 — 2–3 —	AATCC 5 2–3 4 5–6 6 6 (II) 4 — 3–4 —	ISO 5 4 3 6 6–7 6–7 4 — 3–4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: fairly good	Neutral and alkaline: fair Unaffected Slightly affected	Neutral: very good Alkaline: fairly good Somewhat sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather Paper	Becomes greener with anticrease finishes	For bast fibres and straw Leather: see Leather Dyes section Paper, Cellophane, aqueous inks †The dyes listed under this C.I. Generic name are chemical mixtures and their properties vary somewhat in accordance with the proportions of the component intermediates	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 44:1-49

C.I. Direct Yellow	44:1	45	46
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bright Yellow	Reddish Yellow	Bright Greenish Yellow (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Yellow 44 but similar in properties and usage	Normal — Good — Good —	Normal C — — — —
OTHER FIBRES Dyeing Staining		Silk and wool dyed much lighter than cotton Acetate unstained, nylon stained	Silk: suitable Wool dyed heavier than cotton at 100°C. Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		AATCC 5 5 3 — 6 — (II) 3 — 4 —	ISO — 3 4 4 4-5 5 3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Not dischargeable Unaffected Duller	Neutral and alkaline: very good Much duller Redder, much duller
NOTES AND NON-TEXTILE USAGE			Fastness properties improved by aftertreatment with chromium acetate Leather: see Leather Dyes section

47	48	49	C.I. Direct Yellow
	Disazo 23660	Disazo 29035	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellow	Reddish Yellow	Bright Yellow	HUE: Daylight
Normal, sensitive to temperature — — — Very good, temperature control —	Normal — — — Poor —	Normal A — — 40–60 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk dyed. Wool unstained at 40°C and lighter than cotton at 80°C. Acetate unstained		Silk: neutral Silk and wool dyed as cotton Acetate slightly stained, nylon dyed	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium phosphate Wool and silk: suitable			PRINTING
AATCC — — 5 — 7 — (I) 3 — — —	ISO 4 4–5 4 6–7 6–7 7 2–3 — 2 —	ISO 2 2–3 4 5 5 5 1–2 — 2 —	ISO 3 5 3–4 4 4 4–5 2 — 2 —
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
Not dischargeable. Suitable as an illuminating colour in discharge pastes Unaffected Unaffected	Neutral and alkaline: good	Neutral: very good Alkaline fairly good: Unaffected Unaffected Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section		Covers irregular quality viscose yarn Paper Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 50-55

C.I. Direct Yellow	50	51	52																																																							
CHEMICAL CLASS	Disazo	Disazo	Azo																																																							
C.I. CONSTITUTION NUMBER	29025†	29030																																																								
HUE: Daylight	Bright Reddish Yellow	Yellow	Bright Reddish Yellow																																																							
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — 60 — —	Normal — — 40-80 Very good —	Normal C — — — —																																																							
OTHER FIBRES Dyeing Staining	Silk: with Glauber's salt and acetic acid Nylon Silk and wool lighter than cotton Acetate unstained, nylon stained	 Wool slightly lighter than cotton. Acetate very slightly stained	 Silk and wool dyed as cotton Acetate almost unstained																																																							
PRINTING	Cellulose: urea process with disodium orthophosphate for direct styles and for dischargeable grounds	Cellulose: direct prints																																																								
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½-½ normal normal 2 × normal Washing — alteration staining Water — alteration staining	<table><tr><th>AATCC</th><th>ISO</th><th>ISO (on nylon)</th></tr><tr><td>5</td><td>3-4</td><td>—</td></tr><tr><td>3</td><td>3</td><td>—</td></tr><tr><td>3-4</td><td>3-4</td><td>—</td></tr><tr><td>4</td><td>5</td><td>6</td></tr><tr><td>5</td><td>6</td><td>6-7</td></tr><tr><td>6</td><td>6</td><td>6-7</td></tr><tr><td>(I) 2-3</td><td>2-3</td><td>5</td></tr><tr><td>—</td><td>—</td><td>5</td></tr><tr><td>2-3</td><td>2</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table>	AATCC	ISO	ISO (on nylon)	5	3-4	—	3	3	—	3-4	3-4	—	4	5	6	5	6	6-7	6	6	6-7	(I) 2-3	2-3	5	—	—	5	2-3	2	—	—	—	—	<table><tr><th>ISO</th></tr><tr><td>3-4</td></tr><tr><td>4</td></tr><tr><td>4-5</td></tr><tr><td>5</td></tr><tr><td>5</td></tr><tr><td>6</td></tr><tr><td>2</td></tr><tr><td>—</td></tr><tr><td>1-2</td></tr><tr><td>—</td></tr></table> Fast to durable-press finishing	ISO	3-4	4	4-5	5	5	6	2	—	1-2	—	<table><tr><th>ISO</th></tr><tr><td>4-5</td></tr><tr><td>3-4</td></tr><tr><td>4-5</td></tr><tr><td>4</td></tr><tr><td>4-5</td></tr><tr><td>5</td></tr><tr><td>4</td></tr><tr><td>—</td></tr><tr><td>4</td></tr><tr><td>—</td></tr></table>	ISO	4-5	3-4	4-5	4	4-5	5	4	—	4	—
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OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: fairly good Unaffected Unaffected	Neutral: very good Alkaline: moderate-fairly good — —	Good-very good Practically unaffected Practically unaffected																																																							
NOTES AND NON-TEXTILE USAGE	†The dyes listed under this C.I. Generic Name are chemical mixtures and their properties vary somewhat in accordance with the proportions of the component intermediates Combined with direct blues it does not catalyse fading of the blue dye Leather; see Leather Dyes section Paper, Cellophane, anodised aluminium	Paper																																																								

53	54	55	C.I. Direct Yellow	
	Thiazole-Stilbene	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Bright Reddish Yellow	Reddish Yellow→Yellowish Orange	Bright Yellow	HUE: Daylight	
Normal — — 60 Good —	Normal B — — — —	Normal B — — — 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Silk: with acetic or formic acid Silk and wool almost unstained. Acetate unstained	 Silk and wool much lighter than cotton. Acetate slightly stained, nylon stained	 Silk slightly stained, wool almost unstained. Acetate stained	OTHER FIBRES Dyeing Staining	
		Cellulose: urea process with disodium orthophosphate	PRINTING	
ISO 5 3 4 5 5-6 6 2-3 — 2-3 —	AATCC 3 3 5 — 4 — (II) 2 — 4 —	ISO Direct 5 4-5 4 5 6 6 3-4 — 3-4 —	ISO (4) — — — 4 5 5-6 5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good-very good Unaffected Slightly greener	Fair Slightly greener Slightly greener and duller	Fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
	Leather: see Leather Dyes section Paper: beater dyeing	Paper	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Yellow 56-59

C.I. Direct Yellow	56	57	58
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Yellow	Reddish Yellow	Reddish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — — — —	Normal — — — — —	Normal — Very good 80-100 Fair —
OTHER FIBRES Dyeing Staining		Silk: with Glauber's salt and acetic acid Silk, wool and nylon slightly stained. Acetate unstained	 Silk and wool lighter than cotton. Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 1-2 3 4 5 5-6 6 2 — 2-3 —	ISO 5 4 2-3 5 6 6 4 — 4 —	ISO 3 4-5 4-5 6-7 6-7 7 3 — 2-3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good — —	Neutral: very good Alkaline: poor Somewhat weaker Unaffected	Not dischargeable Practically unaffected Little duller
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section	

59	C.I. Direct Yellow								
Thiazole 49000	CHEMICAL CLASS C.I. CONSTITUTION NUMBER								
Greenish Yellow (Direct) Yellow→Red (Aftertreated)†	HUE: Daylight								
Normal C Fair — — 8, 10, NaOCl, <i>m</i> -Phenylenediamine	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment								
Silk: with acetic acid Silk and wool dyed as cotton Acetate and nylon heavily stained	OTHER FIBRES Dyeing Staining								
	PRINTING								
AATCCAATCC Direct — 4 3 — 1-2 — (II) 2 4 —	(8) — 4 3 — 1-2 — (III) 5 5 —	AATCC (10) — 4 4 3 — (III) 5 5 —	AATCC (NaOCl) — 4 4 — 6 — (II) 3 4 —	ISO Direct 3 4-5 3-4 1 1 1 2 3 —	ISO (8) 4 4-5 4 1 1 1 4 4 —	ISO (10) 4-5 3-4 4-5 — 3 — 4 4 —	ISO (MPD) 5 3 3-4 — 1 — 4 4 —	ISO (NaOCl) 4 4-5 4 4 4-5 5 4 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Poor Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron								
Classical name Primuline. The first dye to be discovered which could be diazotised and developed on the fibre †Hues on aftertreatment: Yellow→Reddish Yellow (Phenol); Reddish Yellow (10); Yellowish Orange (Hypochlorite); Dull Reddish Orange (11); Red (8); Dull Red (<i>m</i> -Phenylenediamine) It is a characteristic reaction of this dye that the developed dyeings can be reduced to a yellow which can then be rediazotised and redeveloped with β-naphthol to give the characteristic red Leather Microscopic stain									NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 60-65

C.I. Direct Yellow	60	61	62
CHEMICAL CLASS	Polyazo	Disazo	
C.I. CONSTITUTION NUMBER	36350		36900
HUE: Daylight	Bright Yellow (10)	Bright Yellow (10)	Bright Yellow (10)†
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Poor 10	Normal — Fair — Fair 10	Normal — Fair 40-60 Fairly good 10
OTHER FIBRES Dyeing Staining	 Silk dyed as cotton Wool lighter Acetate stained	Silk: with Glauber's salt and acetic acid Silk and wool dyed as cotton Acetate heavily stained, nylon slightly stained	Silk: with Glauber's salt and acetic acid Silk and wool lighter than cotton Acetate and nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (10) 4 3 4 3 4-5 5-6 3-4 — 4 —	AATCC (10) 5 2 5 — 3 — (II) 2-3 — 5 —	AATCC (10) 5 2 5 — 3 — (II) 4 — 5 — ISO (10) 5 4 5 3 4 4-5 2-3 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: Moderate Alkaline: poor Unaffected Unaffected	Neutral: very good Slightly redder Unaffected	Cotton: neutral very good; alkaline, good Silk: neutral, good-very good Practically unaffected Practically unaffected
NOTES AND NON-TEXTILE USAGE		Leather	†Until diazotisation and development no chromophore is present and the cellulose is only tinted pale yellow Biological stain

63	64	65	C.I. Direct Yellow
Trisazo	Azo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellow (10)	Bright Yellow (10) Bright Orange (8)	Bright Reddish Yellow (10)	HUE: Daylight
Normal C — — 10	Normal C — 80-100 8, 10	Normal B — — 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool much lighter than cotton. Acetate slightly stained, nylon heavily stained	Silk and wool much lighter than cotton. Acetate stained, nylon heavily stained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (10) 5 1 5 4 4 5 (II) 4 5 —	AATCC (8) 5 5 5 — 3-4 — (II) 4 5 —	AATCC (10) 5 4-5 2 5 2-3 3-4 4-5 (III) 4-5 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: fair Redder Little greener and brighter	Very good Slightly affected Somewhat duller	Very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 66-71

C.I. Direct Yellow	66	67	68
CHEMICAL CLASS	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	25225	29080	
HUE: Daylight	Yellow (7)	Yellow (7)	Reddish Yellow (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80-100 Poor 7	Normal — — — — 7	Normal — — — Good-very good 3, 4
OTHER FIBRES Dyeing Staining			Silk lighter than cotton, wool heavier and duller than cotton Acetate stained
PRINTING	Cellulose: for dischargeable grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ - $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (7) 3-4 2 4-5 3 4 4 4 — 4-5 —	ISO (7) 1 4 3-4 — 2 — 3 — 3 —	AATCC (3) 5 3-4 4-5 — 6 — (III) 4-5 — 5 — ISO (3) 4 3-4 4 5 6 6-7 5 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Unaffected Unaffected	Very good	Moderate Unaffected Somewhat affected
NOTES AND NON-TEXTILE USAGE			

69	70	71	C.I. Direct Yellow	
Disazo 25340	Disazo 29295	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Yellow Dull Yellow (3)	Yellow (3)	Greenish Yellow (3)	HUE: Daylight	
Normal — Fairly good 100 Fairly good 3	Normal B — — — 3	Normal — — — Good—very good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Silk and wool lighter than cotton Acetate and nylon unstained	Silk and wool lighter than cotton Acetate stained	Acetate slightly stained	OTHER FIBRES Dyeing Staining	
	Cellulose: urea process with caustic soda and disodium or- thophosphate, steamed and aftertreated		PRINTING	
AATCC (3) 5 3-4 5 — 6 — (II) 2 4 —	ISO (3) 3 3 4-5 5 6-7 7 3-4	AATCC (3) 4 4-5 5 6 7 8 (III) 4 — 5 —	ISO (3) 4 4 3-4 6 7 7-8 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Poor Slightly redder Redder Somewhat sensitive to hard water	Moderate	Moderate—fairly good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
			NOTES AND NON-TEXTILE USAGE	

C.I. Direct Yellow 72-78

C.I. Direct Yellow	72	73
CHEMICAL CLASS	Disazo	Disazo
C.I. CONSTITUTION NUMBER	24910	24850
HUE: Daylight	Dull Reddish Yellow→Dull Yellowish Orange (Chrome Soga) Reddish Orange→Orange (Ergan Soga)	Greenish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	†Chrome Soga and Ergan Soga	Ergan Soga (see C.I. Direct Yellow 72)
OTHER FIBRES Dyeing Staining		
PRINTING		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	<div>ISO</div> <div>Chrome Soga</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>5-6</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div>	<div>ISO</div> <div>Ergan Soga</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>5</div> <div>—</div> <div>Good</div> <div>—</div> <div>Good</div> <div>—</div>
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		
NOTES AND NON-TEXTILE USAGE	†The following methods have been developed in Indonesia for dyeing cotton by the Batik, wax resist process Chrome Soga Method: Apply cold and aftertreat with chromium fluoride Ergan Soga Method: Apply cold in the presence of a chromium salt (chrome oxalate-sulphate complex) and aftertreat with alkali, preferably lime, to complete heavy metal salt formation	

74	75-78	C.I. Direct Yellow
Disazo 25130		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow		HUE: Daylight
Ergan Soga (<i>see</i> C.I. Direct Yellow 72)	Ergan Soga (<i>see</i> C.I. Direct Yellow 72)	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		OTHER FIBRES Dyeing Staining
		PRINTING
Good — Good —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 79-84

C.I. Direct Yellow	79	80	81
CHEMICAL CLASS	Polyazo	Pyrazolone	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Yellow (6)	Bright yellow (6)	Yellow (6)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good 6	Normal — Good — Good 6	Normal — Good — Fair 6
OTHER FIBRES Dyeing Staining	Wool unstained Acetate slightly stained	Silk heavily stained, wool slightly stained. Acetate unstained, nylon slightly stained	Silk dyed as cotton, wool lighter Acetate unstained, nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (6) 2 4 4 — 2 — (I) 5 4 —	AATCC (6) 5 2 5 — 5 — (II) 4 5 —	AATCC Direct 4 5 5 — 3 — (I) 3 3 — AATCC (6) 4 5 5 — — — (II) 3 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good	Neutral: very good Unaffected Unaffected	Neutral: good Unaffected Duller
NOTES AND NON-TEXTILE USAGE			

82	83	84	C.I. Direct Yellow
		Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Yellow	Yellow	Reddish Yellow	HUE: Daylight
—	Normal	—	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section		Paper: beater dyeing sized and unsized, bleachable with chlorine	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 85-90

C.I. Direct Yellow	85	86	87
CHEMICAL CLASS	Azo	Azo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bright Yellow	Bright Reddish Yellow	Bright Greenish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fairly good	Normal B Good 90 Fair 1, 2, 3	Normal B Very good
OTHER FIBRES Dyeing Staining	Silk: neutral Silk and wool much lighter than cotton. Acetate unstained, nylon dyed equal to cotton	Silk: with acetic acid Silk, wool and nylon heavily stained, acetate unstained	Silk: with acetic acid Silk, wool and nylon stained Acetate unstained
PRINTING	Cellulose: direct	Cellulose: direct and discharge prints	Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3-4 4 4 — 5 — 3 — 3 —	ISO 4 4-5 4 — 6-7 — 3 — 3 —	ISO 3-4 5 4 — 4 — 3 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good	Neutral: very good	Neutral: poor
NOTES AND NON-TEXTILE USAGE	Paper	Paper	Paper

88	89	90	C.I. Direct Yellow
Azo	Azo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellow	Bright Greenish Yellow	Yellow	HUE: Daylight
Normal C Very good — 3, 4	Normal C Very good — 3, 4	Normal — Moderate 20-40 Good 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral Silk and wool heavily stained Acetate unstained	Silk: neutral Silk and wool heavily stained Acetate unstained	— Wool stained Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: direct prints after- treated	Cellulose: direct prints after- treated	Cellulose: urea process	PRINTING
ISO Direct 3 4-5 4 — 3 — 4 — 3-4 —	ISO (4) — — — — 4 — 4 — 4 —	ISO (4) — 4-5 2-3 5 4-5 4-5 5 3-4 3 4 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Aftertreated (4): poor	Neutral: very good Aftertreated (4): poor	Neutral 4 Alkaline 4	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper	Covers irregular quality viscose yarn	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 91—96

C.I. Direct Yellow	91	92	93
CHEMICAL CLASS	Disazo	Disazo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Reddish Yellow	Yellow	Bright Yellow Artificial light: redder
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Poor 20 Very good —	Normal and by padding C Very good 40 Good 3, 4	Normal B — 90–100 Migration 2 3 (with acetic acid), 4
OTHER FIBRES Dyeing Staining	 Wool heavily stained Acetate stained	 Silk, wool and nylon stained Acetate, triacetate, polyacrylic and polyester unstained	 Silk, wool and nylon stained Acetate, polyacrylic and polyester unstained
PRINTING	Cellulose: urea process	Cellulose: direct acid discharge prints	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4–5 4 4 5 5 1–2 1 2 1	ISO (3) 1–2 3–4 5 4–5 5 6 4–5 3–4 4–5 3–4	ISO (3 with acetic acid) 3 4–5 5 6–7 7 7 (60°C) 4 4–5 5 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral 5 Alkaline 5 4 4	Neutral: good Alkaline: very good Unaffected Slightly affected Sensitive to hard water	Alkaline 2 4–5 4–5
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn	Fast to resin finishing	Stable to resin finishes Leather

94	95	96	C.I. Direct Yellow	
Azo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Reddish Yellow Artificial light:redder	Bright Yellow Artificial light: slightly redder	Bright Greenish Yellow Artificial light: redder	HUE: Daylight	
Normal C — 95 Migration 1 3, 4	Normal B Very good 90-95 Good 3	Normal A Fair 80 Very good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk, wool and nylon stained Polyacrylic slightly stained Acetate and polyester unstained	— Acetate slightly stained Nylon and wool stained	Wool: acetic acid Acetate and nylon unstained in slightly alkaline dyebath	OTHER FIBRES Dyeing Staining	
Cellulose: direct	Cellulose: direct prints aftertreated	Cellulose: direct	PRINTING	
ISO (3) 2-3 4 5 5-6 6-7 6-7 (60°C) 4-5 4-5 5 5	ISO (3) 5 4 5 5-6 6-7 7 (60°C) 4-5 4-5 5 5	ISO (Direct) 3-4 4-5 4 2 3 3 (40°C) 3-4 3-4 4 1-2	ISO (5) 3-4 4-5 4 2 3 3 (40°C) 3-4 4-5 4-5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Alkaline 4 5 5 Slightly sensitive to hard water	Poor — Considerably redder	Not dischargeable — Considerably redder	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Stable to resin finishes Leather	Leather: on chrome tannage, aftertreated	Fastness on wool. Light 2 Leather: see Leather Dyes section Paper	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Yellow 97-102

C.I. Direct Yellow	97	98	99
CHEMICAL CLASS		Azo	Diazo (Stilbene)
C.I. CONSTITUTION NUMBER			
HUE: Daylight		Bright Yellow Artificial light: slightly redder	Reddish Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is discontinued	Normal B Good 90-100 Good 4	Normal A Good 40-50 Good —
OTHER FIBRES Dyeing Staining		Acetate unstained, nylon slightly stained	Wool: with Glauber's salt and acetic acid Silk: with acetic acid Nylon: with acetic or formic acid Wool, silk and nylon dyed Acetate unstained
PRINTING		Cellulose: direct prints	Cellulose: direct (urea) and discharge prints
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 4-5 4 4 6 7 7-8 (40°C) 4 3-4 5 4	ISO (4) 4 4-5 3-4 6 6-7 7 (40°C) 4 5 5 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Not dischargeable 4-5 4-5 Sensitive to hard water	Neutral: good Alkaline: fair Practically unaffected Practically unaffected
NOTES AND NON-TEXTILE USAGE		Covers irregular quality viscose yarn and dead cotton Leather: see Leather Dyes section	Heavy metal salts Leather Paper

100	101	102	C.I. Direct Yellow
Azo		Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellow		Reddish Yellow Artificial light: redder and brighter	HUE: Daylight
Normal	This C.I. Generic Name is discontinued	Normal B Good 90-95 Good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
		Nylon heavily stained Acetate, polyacrylic and polyester slightly stained	
		Cellulose: direct and discharge prints, aftertreated	PRINTING
		ISO (3) 4-5 3-4 5 6 6-7 7 (60°C) 4 4 4-5 4	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1-1/2 normal normal 2 / normal Washing — alteration staining Water — alteration staining
		Very good with anthraquinone — Considerably affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: chrome tannage, after-treated	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 103-107

C.I. Direct Yellow	103	104
CHEMICAL CLASS	Stilbene	
C.I. CONSTITUTION NUMBER		
HUE: Daylight	Bright Greenish Yellow Artificial light: slightly redder	Yellow Artificial light: little redder
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 80-100 Good —	
OTHER FIBRES Dyeing Staining	 Silk, wool and nylon heavily stained Polyester and modified acrylics slightly stained Acetate and acrylics unstained	
PRINTING		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 3 5 2-3 3 3-4 3 — 3 —	ISO on paper 5 3-4 — — 2 — — — Unsize 2, size 4 — Calendering 4-5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Slightly duller Slightly duller	
NOTES AND NON-TEXTILE USAGE	Paper: on sulphate and sulphite stocks, this being the main use of this dye	

105	106	107	C.I. Direct Yellow
Stilbene	Stilbene	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Yellow Artificial light: brighter	Bright Reddish Yellow Artificial light: redder	Bright Greenish Yellow Artificial light: unchanged	HUE: Daylight
Normal A Good 95 Good	Normal B Good 95 Good 5		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate and nylon unstained	Acetate and nylon unstained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 4 4 — — 6 — (65°C) 3-4 4 3 4	AATCC 4-5 4-5 4 — 5-6 — 3-4 (II) 3-4 —	ISO — 5 4 4 5 6 3 2 4 2	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Not dischargeable	Neutral 1 Alkaline 1 4-5 3 (yellowed and duller)		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Effect of U/F resin finish Shade 4, Light unaffected	Effect of U/F resin finish Shade 4, Light 6	Paper: beater dyeing, sized and unsized fully bleachable with chlorine	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 108-113

C.I. Direct Yellow	108	109	110
CHEMICAL CLASS		Trisazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bright Greenish Yellow	Bright Yellow	Bright Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal, sensitive to electrolytes C Good 100 Fair 5	Normal A Good 80 Good 5	Normal A Very good 80 Good 5
OTHER FIBRES Dyeing Staining	 Acetate slightly stained	 Acetate unstained	Silk: neutral Acetate unstained
PRINTING	Cellulose: direct and discharge		Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 5 3-4 3-4 5-6 6 6-7 (40°C) 3-4 2-3 4 3-4	ISO Direct 5 4-5 3-4 6-7 7 7-8 (40°C) 2-3 3-4 4 2-3	ISO (Direct) 4-5 3 3-4 5 5 5-6 (40°C) 3 2-3 3-4 2-3
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: very good Trace duller Slightly redder Sensitive to hard water	Neutral and alkaline: poor Unaffected Unaffected	Neutral and alkaline: very good Unaffected Practically unaffected
NOTES AND NON-TEXTILE USAGE			

111	112	113	C.I. Direct Yellow
Azo		Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellow		Reddish Yellow	Hue: Daylight
Normal — Moderate 80 Good —	This C.I. Generic Name is no longer in use		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate stained, wool unstained			OTHER FIBRES Dyeing Staining
Cellulose: Urea process			PRINTING
ISO 4-5 3 3 4 4-5 5 2-3 2-3 4-5 4			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral 3-4 Alkaline 3 1 4-5			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Paper: Beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 114—119

C.I. Direct Yellow	114	115	116
CHEMICAL CLASS C.I. CONSTITUTION NUMBER	Stilbene		
HUE: Daylight	Yellow		Yellow
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		This C.I. Generic Name is discontinued	
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
NOTES AND NON-TEXTILE USAGE	Paper: Beater dyeing Literature: USP 2865908		Paper: Beater dyeing

117	118	119	C.I. Direct Yellow
Disazo	Disazo	Quinoline	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellow Artificial light: redder	Bright Yellow	Greenish Yellow	HUE: Daylight
— — Very good — Very good —		Normal — Complete in 30 minutes — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk, wool and nylon heavily stained. Acetate unstained		Silk and wool dyed, acetate stained. Nylon dyed	OTHER FIBRES Dyeing Staining
			PRINTING
		AATCC — — 5 — 4 — (2A) 2 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Alkaline: good	Not dischargeable	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: Beater dyeing Fastness on paper—caustic soda, good; sulphuric acid, fair; light, excellent; water, excellent; sodium hypochlorite, poor	Paper: Beater dyeing Good affinity for fillers Fastness on paper: H ₂ SO ₄ 1%, good; NaOH 1%, excellent; chlorine, bleached	Can be applied together with sulphur dyes Paper: Beater dyeing. Affinity for clay and calcium carbonate, good; affinity for titanium dioxide, fair. Fastness on paper: Sulphuric acid, good; caustic soda, good; chlorine, poor; light, good; water good; sodium silicate, very good	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 120—125

C.I. Direct Yellow	120	121	122
CHEMICAL CLASS	Disazo	Disazo	
C.I. CONSTITUTION NUMBER			
Hue: Daylight	Bright Yellow	Reddish Yellow	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Yellow 86
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Alkaline: good	
NOTES AND NON-TEXTILE USAGE	Paper: Beater dyeing of bond, writing, duplicator and envelope stock Fastness on paper: Sulphuric acid, good; caustic soda, good; chlorine, poor; light, good; water, good; sodium silicate, very good	Paper: Beater dyeing Good affinity for fillers; stable to pH changes Fastness on paper: H ₂ SO ₄ 1% good; NaOH 1%, excellent; chlorine, bleached; light, very good; water, good	

123	124	125	C.I. Direct Yellow
	Stilbene	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Greenish Yellow	Greenish Yellow	HUE: Daylight
This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Yellow 84			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper: Beater dyeing pH 4·5–5·5 preferred Not discharged by chlorine	Paper: Beater dyeing pH 4·5–5 preferred Discharged by chlorine	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 126—131

C.I. Direct Yellow	126	127	128
CHEMICAL CLASS	Disazo	Monoazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Reddish Yellow	Yellow	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — —		This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Yellow 127
OTHER FIBRES Dyeing Staining	Wool —		
PRINTING	Cellulose		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 2-3 5 — 4 4 4-5 4-5 3 — —		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: poor Unchanged Unchanged		
NOTES AND NON-TEXTILE USAGE		Paper: Beater dyeing Fastness on paper: Light, good; chlorine, poor	

129	130	131	C.I. Direct Yellow
Monoazo	Stilbene	Methine	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellow Artificial light: redder	Greenish Yellow	Bright Greenish Yellow	HUE: Daylight
Normal — — 90 Good —	Normal — Fair 90 — —		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool heavily stained, silk and nylon slightly stained, acetate unstained	Silk and nylon: Glauber's salt and acetic acid Polyester, acrylic and acetate unstained. Wool heavily stain- ed		OTHER FIBRES Dyeing Staining
			PRINTING
ISO (Cotton) (Silk)* 5 — 5 — 5 5 6-7 6 7 6-7 7 — 2 3 2-3 — 3-4 4-5 2 —	ISO 5 3 5 — 5-6 — 4-5 5 — —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Not dischargeable Unchanged Unchanged	Good Unaffected Unaffected		OTHER PROPERTIES Dischargeability Effect of metals — copper Iron
Good coverage of dead cotton *Unweighted	Paper: Beater dyeing and coat- ing	Paper: Beater dyeing and coatings Fastness on paper: Light, poor; water, good; chlor- ine, poor; graniting, none	NOTES AND NON-TEXTILE USAGE

C.I. Direct Yellow 132—136

C.I. Direct Yellow	132	133	134
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Yellow	Reddish Yellow	Reddish Yellow Artificial light: redder
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS: PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
NOTES AND NON-TEXTILE USAGE	Paper Fastness on paper: Alkali, good; acid, fair; chlorine, poor; light, 3, 4, 4-5	Paper Fastness on paper: Acid, poor; alkali, good; chlorine, poor; light, 3, 4-5, 5; water, good	Paper: Beater dyeing High affinity Fastness on paper: Light, good; water, very good; H ₂ SO ₄ 1%, poor; Na ₂ CO ₃ 10%, moderate; alum 10%, very good

135	136		C.I. Direct Yellow
Polyazo	Polyazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Greenish Yellow	Reddish Yellow		HUE: Daylight
Normal — Good 95 Very good 5	Normal — Very good 95 Good 5		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool: by special method Acetate slightly stained	— Acetate unstained		OTHER FIBRES Dyeing Staining
Cellulose: direct process	Cellulose: direct process		PRINTING
ISO Direct 4 4 4, 5 4-5 5 5-6 3-4 3-4 4 3-4	ISO Direct 4D 4-5 4, 5 6 6-7 6-7 4-5 3-4 4 4-5		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor Redder, duller Redder, duller Sensitive to hard water	Not dischargeable Unaffected Unaffected Sensitive to hard water		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange	1	2	3
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22370, 22375 and 22430	22380	26280
HUE: Daylight	Yellowish Orange→Orange	Orange	Bright Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 40–60 — —	Normal — Good 60 — —	Normal — — 100 Fair —
OTHER FIBRES Dyeing Staining	Wool and silk: weakly acid bath Nylon: weakly acid bath or with ammonium tartrate Silk and wool dyed as cotton. Nylon dyed. Acetate stained	— Wool dyed equal depth to cotton. Acetate stained	— Silk much lighter than cotton; wool lighter than cotton; acetate unstained to slightly stained
PRINTING	Cellulose: Urea process with disodium orthophosphate Nylon: with ammonium tartrate		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4 2 3 2 2–3 3–4 (I) 3–4 — 2 —	ISO 3 3 2 2 3 3–4 2 — 2 —	ISO 5 4 4 2 3 4 2–3 — 2–3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good–very good Alkaline: fairly good–good Much redder Duller	Neutral: very good Alkaline: poor Much redder Little redder Somewhat sensitive to hard water	Neutral and alkaline: good Weaker Unaffected Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Paper: Beater dyeing Leather: see Leather Dyes section Variable solubility influences the selection of brands for certain purposes See C.I. Direct Orange 2, 30 and 31 for dyes with similar properties and constitution	Soap See C.I. Direct Orange 1, 30 and 31 for dyes with similar properties and constitution	

C.I. Direct Orange 4—9

C.I. Direct Orange	4	5	6
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22920	28650	23365/23375
HUE: Daylight	Bright Orange	Bright Orange	Yellowish Orange (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Good —	Normal — — 80 Good —	Normal B Good—very good 60 — 2, 7
OTHER FIBRES Dyeing Staining	 Silk dyed lighter than cotton; wool dyed as cotton; acetate stained	 Silk dyed lighter than cotton; wool dyed as cotton; acetate stained	Nylon: neutral or by padding with ammonium tartrate Wool dyed heavier than cotton; silk dyed lighter than cotton; acetate stained; nylon dyed
PRINTING			Nylon: with ammonium tartrate
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4 2 2 3 3 2 — 2 —	ISO 4 4 3 2 3 3 1-2 — 2 —	AATCC (Direct) ISO (Direct) ISO (2) ISO (7) 3 3 3 2 3 3-4 5 3 4 4 4 2 — 1 — 2 2 1 3-4 2 — 1 — 3 (I) 3 2 2-3 2-3 — — — — 3 2 2-3 2-3 — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good—very good Trace weaker Unaffected Very sensitive to hard water	Neutral and alkaline: very good Yellower Weaker Somewhat sensitive to hard water	Neutral: fair—good Alkaline: poor—fairly good Redder Little redder
NOTES AND NON-TEXTILE USAGE			Leather: see Leather Dyes section Paper: Beater dyeing

7	8	9	C.I. Direct Orange
Disazo 23380	Disazo 22130 + 22140*	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Orange (Direct)	Reddish Orange (Direct) Dull Reddish Orange (7)	Yellowish Orange	HUE: Daylight
Normal B — 40 — 2, 7	Normal C — 60–80 — —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool dyed heavier than cotton. Silk dyed as cotton. Acetate slightly stained	— Wool and silk dyed as cotton. Nylon dyed	— Wool and silk reserved at low temperatures. Acetate— <i>v.s.</i> stained. Nylon— <i>s.</i> stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (Direct) 3–4 3–4 4 1–2 2 2–3 1–2 — 2 —	AATCC 1 2 5 — 2–3 — (I) 1 — 2 —	AATCC 5 1 5 — 2 — (I) 4–5 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fair–good	Neutral and alkaline: fairly good Redder and brighter Duller	Poor Much redder Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper: Beater dyeing. Fastness: Caustic soda 1%, good; sulphuric acid 1%, poor; light, good; water, good Reaction on cellulose H ₂ SO ₄ 10%—blue NaOH 10%—red *Minor component	Leather Paper Reaction on cellulose Zn + NH ₄ OH—reddish orange (on oxidation)	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 10—15

C.I. Direct Orange	10	11	12
CHEMICAL CLASS	Disazo	Trisazo	Azo
C.I. CONSTITUTION NUMBER	23370		
HUE: Daylight	Bright Orange (Direct) Reddish Brown (7)	Dull Yellowish Orange	Bright Reddish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 100 — 7	Normal — Good — Fair —	Normal A — — — —
OTHER FIBRES Dyeing Staining	Nylon: neutral (poor light fastness) Wool dyed as cotton	Silk and nylon: with Glauber's salt and acetic acid Silk and wool dyed heavier than cotton Acetate stained, nylon dyed	— Silk equal to cotton, wool dyed heavier than cotton Acetate stained
PRINTING		Cellulose, silk and wool: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 3 3 4 — 2 — (I) 3 — — 3 —	ISO (Direct) 2-3 4 3-4 1 1 1 2 — — 2 —	ISO (7) 3-4 3-4 2 2 1-2 — (I) 1 — — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair-fairly good Alkaline: fair Unaffected Duller	Neutral: very good Unaffected Slightly redder	Neutral and alkaline: very good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Leather Paper: Beater dyeing	Bichromate aftertreatment improves the fastness to light and to wet treatments Leather Paper: For beater dyeing and coating	Covers irregular quality viscose

13	14	15	C.I. Direct Orange
Disazo 23605	Stilbene	Stilbene 40002 and 40003	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Reddish Orange	Orange	Orange→Reddish Orange	HUE: Daylight
Normal — Good 100 Good —	Normal — 100 Fairly good —	Normal B Fair 60–100 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and nylon: neutral bath Wool: with Glauber's salt and ammonium acetate Silk dyed as cotton, wool heavier. Acetate slightly stained, nylon dyed		Silk: formic acid Silk and wool lighter than cotton. Acetate and nylon unstained to slightly stained	OTHER FIBRES Dyeing Staining
Cellulose, silk and wool: suitable	Cellulose: direct	Cellulose: urea process with disodium orthophosphate Silk and wool: suitable	PRINTING
AATCC ISO 1 1–2 5 5 5 3 — 2 2–3 3 — 3 (I) 1 1–2 — — 2 1–2 — —	ISO 4 3–4 3 3 3–4 4 4–5 — 4 —	AATCC ISO 4–5 4–5 1–2 2–3 5 4 — 3 2–3 3–4 — 4 (I) 4–5 3 — — 3 3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Alkaline: poor–fair Unaffected Unaffected Somewhat sensitive to hard water	Neutral and alkaline: fair	Neutral and alkaline: fair Yellower Yellower	OTHER PROPERTIES Dischargeability Effect of metals — copper Iron
Leather: Occasional use Paper: Occasionally for beater dyeing	Paper	Heavy metal salts used as pigments Leather: see Leather Dyes section Paper: Beater dyeing. Fastness on paper: Caustic soda 1%, fair; sulphuric acid 1%, good; light, very good; water, good Microscopic stain	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 16—21

C.I. Direct Orange	16	17	18
CHEMICAL CLASS	Trisazo	Monoazo	Azo-thiazole
C.I. CONSTITUTION NUMBER		19160	20215, 20216 and 20230
HUE: Daylight	Reddish Orange	Bright Yellowish Orange	Orange→Dull Orange†
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — —	Normal — — — Good —	Normal C Fair 100 — 3
OTHER FIBRES Dyeing Staining	— Silk and wool dyed equal to cotton Acetate slightly stained	— Silk and wool dyed lighter than cotton Acetate unstained	— Silk and wool dyed as cotton but yellower Acetate stained, nylon dyed
PRINTING			Cellulose: urea process for direct styles
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO 4 2 3 1 1-2 2 2 — 2-3 —	ISO 4-5 4 3 2 2 3 2 — 2 —	AATCC ISO ISO (3) 5 5 3-4 2 3 3 4 4 4 1 2 — 1-2 2 4 2 3 — (I) 3 2 3 — — — 1-2 2 2-3 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good — —	Not dischargeable — —	Neutral and alkaline: poor-fair Slightly redder and duller Practically unaffected
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section	†Hue becomes duller when aftertreated with copper sulphate Leather: See Leather Dyes section Paper: Beater dyeing

19	20	21	C.I. Direct Orange	
Disazo	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Bright Orange	Yellowish Orange (Direct) Reddish Brown (3)	Orange	HUE: Daylight	
Normal — Good — Good —	Normal — — 80-100 Good-very good 3	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk and wool much lighter than cotton. Good reserve dyed cold. Acetate unstained, nylon slightly stained		Silk: neutral bath Silk and wool dyed heavier than cotton. Acetate slightly stained, nylon dyed	OTHER FIBRES Dyeing Staining	
			PRINTING	
AATCC 5 2 5 — 2 — (I) 4 4 —	ISO (Direct) 4-5 3 — 2 2 2-3 3 — 4 —	ISO (3) 3-4 3-4 4 2-3 3 3-4 3-4 — 4 —	AATCC 1 5 3 — 3 — (I) 2 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
— Much yellower and duller Duller and weaker	Neutral and aftertreated: fair	Cellulose: neutral, good Silk: neutral, fairly good Unaffected Much bluer	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: Occasional use on chrome tannages		Leather: Occasionally on chrome tannages	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Orange 22—27

C.I. Direct Orange	22	23	24
CHEMICAL CLASS	Stilbene		Disazo
C.I. CONSTITUTION NUMBER	40004		20130
HUE: Daylight	Bright Reddish Orange	Bright Yellowish Orange	Dull Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80–100 Fair —	Normal A — 40–60 Very good —	Normal — — 80 Good —
OTHER FIBRES Dyeing Staining	— Silk and wool lighter than cotton Acetate unstained	Silk: neutral, excellent affinity Wool dyed heavier than cotton Acetate heavily stained	— Silk and wool dyed lighter than cotton
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 3–4 4 4 4–5 4–5 2–3 — 3–4 —	ISO 5 5 4 2 3 3 1–2 — 1–2 —	ISO 2 4 2 1 2 3 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkline: poor Little duller Little duller Somewhat sensitive to hard water	Neutral and alkaline: very good Practically unaffected Markedly affected	Poor (yellow) Trace duller Unaffected
NOTES AND NON-TEXTILE USAGE	Literature: <i>BIOS Misc.</i> 20, Appendix 18	Levels well on viscose and covers irregular quality yarn Somewhat redder and weaker with anticrease finishes Leather: see Leather Dyes section	Unsuitable for goods to be given anticrease finishes Paper

25	26	27	C.I. Direct Orange
Disazo 22135	Disazo 29150	Stilbene 40066	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Orange	Bright Reddish Orange→Bright Yellowish Red	Dull Reddish Orange	HUE: Daylight
Normal — — — Fairly good —	Normal C Very good 60–100 — —	Normal — — 40–60 Poor —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed as cotton. Acetate practically unstained	Silk and wool: with Glauber's salt and acetic acid Nylon: with formic acid Silk and wool lighter than cotton, wool yellower. Acetate slightly stained, nylon heavily stained	— Silk and wool dyed lighter than cotton Acetate stained	OTHER FIBRES Dyeing Staining
	Cellulose and silk: urea process with disodium orthophosphate		PRINTING
ISO 2 4 4 — 1–2 — 2 — 2–3 —	AATCC 4 5 1 — 2 — (1) 1–2 — 2 —	ISO 5 4 2 2 2–3 3 1–2 — 1–2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good —	Neutral and alkaline: fair–fairly good Slightly duller Unaffected	Neutral and alkaline: fair Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: See Leather Dyes section Paper: Beater dyeing and occasionally coating See also C.I. Direct Orange 29 and 29:1	Aftertreatment 3 may be used	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 27:1—31

C.I. Direct Orange	27:1	28	29																																																																						
CHEMICAL CLASS	Stilbene	Stilbene	Disazo																																																																						
C.I. CONSTITUTION NUMBER		40065	29155																																																																						
HUE: Daylight		Dull Reddish Orange (Direct)†	Bright Reddish Orange→ Bright Yellowish Red																																																																						
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Orange 27 but similar in properties and usage	Normal — Good Good at low temperatures Fairly good—good 7, 8, 9	Normal B Good 80 — —																																																																						
OTHER FIBRES Dyeing Staining		Silk and wool: neutral bath with Glauber's salt Silk as cotton but yellower. Wool lighter than cotton but yellower Acetate slightly stained, nylon dyed	Silk and wool: with Glauber's salt and acetic acid Nylon: formic acid Silk and wool lighter than cotton. Acetate unstained, nylon heavily stained																																																																						
PRINTING			Cellulose: urea process with disodium orthophosphate																																																																						
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3—1/2 normal normal 2× normal Washing — alteration staining Water — alteration staining		<table><tr><td>AATCC (Direct)</td><td>ISO (Direct)</td><td>ISO (7)</td><td>ISO (8)</td><td>ISO (9)</td></tr><tr><td>3</td><td>1</td><td>3</td><td>2</td><td>2-3</td></tr><tr><td>3</td><td>3</td><td>1</td><td>3</td><td>2</td></tr><tr><td>3</td><td>2-3</td><td>—</td><td>2</td><td>2-3</td></tr><tr><td>—</td><td>2-3</td><td>2</td><td>1</td><td>1</td></tr><tr><td>2-3</td><td>2-3</td><td>2</td><td>1</td><td>1</td></tr><tr><td>—</td><td>2-3</td><td>2</td><td>1</td><td>1</td></tr><tr><td>(I) 2</td><td>2</td><td>2</td><td>4-5</td><td>2-3</td></tr><tr><td>3</td><td>3</td><td>5</td><td>5</td><td>5</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC (Direct)	ISO (Direct)	ISO (7)	ISO (8)	ISO (9)	3	1	3	2	2-3	3	3	1	3	2	3	2-3	—	2	2-3	—	2-3	2	1	1	2-3	2-3	2	1	1	—	2-3	2	1	1	(I) 2	2	2	4-5	2-3	3	3	5	5	5	—	—	—	—	—	<table><tr><td>AATCC</td><td>ISO</td></tr><tr><td>4</td><td>5</td></tr><tr><td>5</td><td>4</td></tr><tr><td>1</td><td>2</td></tr><tr><td>—</td><td>2</td></tr><tr><td>2-3</td><td>2-3</td></tr><tr><td>—</td><td>3-4</td></tr><tr><td>(I) 1-2</td><td>1-2</td></tr><tr><td>1-2</td><td>1-2</td></tr><tr><td>—</td><td>—</td></tr></table>	AATCC	ISO	4	5	5	4	1	2	—	2	2-3	2-3	—	3-4	(I) 1-2	1-2	1-2	1-2	—	—
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(I) 1-2	1-2																																																																								
1-2	1-2																																																																								
—	—																																																																								
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: fair Alkaline: poor-fair Little yellow and duller Duller	Neutral and alkaline: fairly good Slightly duller Unaffected																																																																						
NOTES AND NON-TEXTILE USAGE		†Hues on aftertreatment: Bordeaux (8), Reddish Brown (9), Reddish Orange (7)	Similar in usage to C.I. Direct Orange 26 but has superior solubility Leather: see Leather Dyes section																																																																						

29:1	30	31	C.I. Direct Orange
Disazo	Disazo 23665	Disazo 23655	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Orange	Reddish Orange	HUE: Daylight
Slightly different chemically from C.I. Direct Orange 29 but similar in properties and usage	Normal — — Good —	Normal — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed as cotton Acetate stained	— Silk and wool dyed equal to cotton Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO 4 3 4-5 — 3 — 2 — 2-3 —	ISO 4 3-4 4 — 3 — 2-3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Very good — —	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	See C.I. Direct Orange 1, 2 and 31 for dyes with similar properties and constitution	See C.I. Direct Orange 1, 2 and 30 for dyes with similar properties and constitution	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 32—36

C.I. Direct Orange	32	33	34
CHEMICAL CLASS	Disazo	Disazo	Stilbene
C.I. CONSTITUTION NUMBER	20215	22385	40215 and 40220
HUE: Daylight	Orange	Yellowish Orange	Yellowish Orange (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Very good —	Normal — — — — —	Normal B Good 80-90 — 6
OTHER FIBRES Dyeing Staining	— Silk dyed equal to cotton, wool slightly lighter Acetate stained	 	— Silk much lighter than cotton, wool lighter. Acetate and nylon un- stained to slightly stained
PRINTING			Cellulose: urea process with di- sodium orthophosphate Silk and wool: suitable
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4-5 2 4-5 — 1-2 — 3 — 3 —	ISO 3 5 4 4 4 4-5 1-2 — 1-2 —	AATCC AATCC ISO ISO (Direct) (6) (Direct) (6) 5 5 3-4 3-4 5 5 4 5 3 3 3 4 — — 5-6 — 6 6 6 6 — — 6-7 — (I) 3 (I) 5 2 2-3 3 5 2 2-3 — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fairly good — —	Neutral: very good Alkaline: poor — —	Neutral: fairly good Alkaline: fair Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE			Heavy metal salts have pigment usage Leather: See Leather Dyes section Paper: Beater dyeing and occasion- ally coating See also C.I. Direct Orange 39, 60 and 61 for dyes of similar properties and usage

34:1	35	36	C.I. Direct Orange
Stilbene	Stilbene 40225	Stilbene 40230	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Reddish Orange	Yellowish Orange	HUE: Daylight
Slightly different chemically from C.I. Direct Orange 34 but similar in properties and usage	Similar in properties and usage to the dyes listed under C.I. Direct Orange 34	Normal — — 100 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
		ISO 4 4-5 4 5 5-6 6 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		Neutral: fairly good-good Alkaline: fair — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 37—40:1

C.I. Direct Orange	37	37:1	38
CHEMICAL CLASS	Stilbene	Stilbene	Stilbene
C.I. CONSTITUTION NUMBER	40260 and 40265		
HUE: Daylight	Reddish Orange (Direct)	Reddish Orange (Direct)	Reddish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 100 — 6	Slightly different chemically from C.I. Direct Orange 37 but similar in properties and usage	Normal — Good — Good —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained		— Silk and wool dyed lighter and yellower than cotton. Acetate and nylon unstained
PRINTING	Cellulose: urea process with disodium orthophosphate Silk and wool: direct		Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (Direct) 3 2-3 3 — 5-6 — (I) 2-3 — 2-3 —	ISO (Direct) 4 4 2 5-6 6 6 3 — 3 —	AATCC 5 5 3 — 4 — (II) 3 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: neutral, fairly good; alkaline, fair Practically unaffected Practically unaffected		Neutral: good Unaffected Duller and weaker
NOTES AND NON-TEXTILE USAGE	Leather: See Leather Dyes section Paper: Beater dyeing Miscellaneous: Colouring aqueous inks and water colours		Leather: Occasional use on chromed tannages

39	40	40:1	C.I. Direct Orange
Stilbene 40215	Stilbene 40265	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Orange (Direct)	Dull Reddish Orange	Dull Reddish Orange	HUE: Daylight
Normal B Good 80 — 4	Normal B — — —	Slightly different chemically from C.I. Direct Orange 40 but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: Glauber's salt and acetic acid Silk slightly stained, wool heavily stained. Acetate and nylon slightly stained	— Silk and wool dyed lighter than cotton, yellower also at high temperatures. Acetate unstained, nylon heavily stained		OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate	Cellulose: urea process with disodium orthophosphate		PRINTING
AATCC (Direct) ISO (Direct) ISO (4) 4 4-5 4-5 5 4 3-4 3-4 3 3-4 5 6 4 5-6 6-7 5 6 6-7 5 (II) 4 3 3 — — — 3 3 4 — — —	AATCC ISO 5 4 2 3 4 3 — 4-5 4-5 5 — 5 (I) 4-5 3 — — 2 2-3 — —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: neutral, good; alkaline, poor-fair Aftertreated: alkaline with anthraquinone, fair Unaffected Unaffected	Neutral: fair Alkaline: poor Yellower Yellower		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: Occasional use on chrome tannages Paper: Beater dyeing See also C.I. Direct Orange 34 and 60	Leather: see Leather Dyes section Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 41—46

C.I. Direct Orange	41	42	43	
CHEMICAL CLASS	Stilbene	Polyazo	Disazo	
C.I. CONSTITUTION NUMBER	40235			
HUE: Daylight	Reddish Orange	Bright Yellowish Orange	Orange	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 100 Fair —	Normal — Good — Good —	Normal — — 70 Fairly good —	
OTHER FIBRES Dyeing Staining	Silk: suitable for unweighted and weighted silk Silk dyed lighter and much yellower than cotton. Wool slightly stained. Acetate unstained, nylon stained	— Silk dyed lighter than cotton. Wool slightly stained, acetate unstained	— Silk and wool heavily stained Acetate unstained	
PRINTING		Cotton and silk: suitable		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½—½ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 3-4 5 — 6 — (I) 1-2 — 2 —	ISO 4-5 4 3-4 5-6 6 6-7 3 — 3 —	AATCC 4 3 5 — 2-3 — (I) 3 — 4 —	ISO 3-4 4 3 3 4-5 4-5 3-4 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose: neutral, moderate; alkaline, poor Silk: neutral, fairly good-good Slightly redder Trace redder Somewhat sensitive to hard water	Neutral and alkaline: very good Yellower Yellower	Neutral: good Alkaline: poor — —	
NOTES AND NON-TEXTILE USAGE	Leather: On chrome tannage Paper: Beater dyeing and occasionally coating	Paper		

44	45	46	C.I. Direct Orange
		Stilbene 40215	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
		Bright Orange	HUE: Daylight
This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Orange 34 —	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Orange 37 —	Normal — Very good 80-100 Fair —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		— Silk and wool dyed lighter than cotton Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
		ISO 3 5 3 6 6-7 6-7 2-3 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		Neutral: good Alkaline: fair Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Light fastness impaired by anti-crease finishes Paper Soap Aqueous inks	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 47—52

C.I. Direct Orange	47	48	49
CHEMICAL CLASS	Azo	Azo	Disazo
C.I. CONSTITUTION NUMBER			29050
HUE: Daylight	Dull Orange	Reddish Orange	Bright Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Very good —	Normal C — — — —	Normal B — 80 — —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed much lighter than cotton. Acetate and nylon unstained to slightly stained	— Wool dyed slightly lighter than cotton Acetate stained	Silk: suitable for unweighted and weighted silk Silk and wool dyed lighter than cotton Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 1 5 — 4 — (II) 3 4 —	AATCC 1 3-4 3 — 5 — (II) 4 4 —	ISO 3-4 3-4 3 4 5 5 3-4 — 4-5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair — Duller	Neutral: very good Alkaline: poor, but suitable for most coloured discharges Unaffected Trace yellower	Neutral and alkaline: good-very good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE		Unaffected by antcrease finishes	Leather Paper

50	51	52	C.I. Direct Orange
Azo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Orange	Bright Orange	Yellowish Orange	HUE: Daylight
Normal — — — Good—very good —	Normal B — — — —	Normal A — 40–80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed yellower than cotton, wool lighter. Acetate unstained, nylon slightly stained	Wool dyed lighter than cotton. Silk stained, acetate unstained	Acetate unstained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate	Viscose: urea process	PRINTING
ISO 3–4 4 3–4 6 6–7 6–7 2–3 — 2–3 —	AATCC ISO 5 — 4–5 4 5 3 — 3 4–5 5 — 5 (II) 3 3 — — 4–5 3–4 — —	AATCC ISO 5 4 4–5 4 5 3 6 6 6–7 6–7 7 7 (II) 3–4 4–5 — — 4 3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Alkaline: fair	Neutral and alkaline: very good	Neutral and alkaline: very good	OTHER PROPERTIES Dischargeability
Unaffected Slightly affected	— —	Slightly affected Slightly affected	Effect of metals — Copper Iron
	Paper Leather: see Leather Dyes section	Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 53-57

C.I. Direct Orange	53	54	55
CHEMICAL CLASS	Polyazo		Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bright Reddish Orange	Dull Orange	Dull Reddish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — —	Normal C — — — —	Normal — Good — Good —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed lighter than cotton. Acetate unstained	— Wool unstained	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon heavily stained
PRINTING		Cellulose: urea process	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4-5 3 5 — 4-5 — (I) 3 3-4 —	ISO 4 3 3-4 4 4-5 5 4 — 4 —	AATCC 1 2 3 — 5 — (I) 4-5 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: very good Trace affected Slightly affected	Neutral and alkaline: very good — —	— Yellower Redder and duller
NOTES AND NON-TEXTILE USAGE	Paper Heavy metal salts have pigment usage	Light fastness slightly improved by anticrease finishes	Leather: on chrome tannages

55:1	56	57	C.I. Direct Orange
Polyazo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Orange	Dull Orange	Bright Orange	HUE: Daylight
Slightly different chemically from C.I. Direct Orange 55 but similar in properties and usage	Normal C — — 4	Normal — — 60-80 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk dyed equal to cotton, wool lighter and yellower Acetate stained, nylon dyed	Silk: acetic or formic acid Silk and wool almost unstained Acetate unstained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate		PRINTING
	AATCC (Direct) 3-4 2-3 5 — 5-6 — (II) 2 — 4 — ISO (Direct) 3-4 2-3 3 5-6 6 6-7 4 — ISO (4) — — 5 6 6-7 5 —	ISO 3 4 3-4 6 6-7 6-7 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
	Neutral and alkaline: fairly good Slightly affected Unaffected	Neutral: good—very good Alkaline: good Yellower Yellower and duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 58-62:1

C.I. Direct Orange	58	59	60
CHEMICAL CLASS		Disazo	Stilbene
C.I. CONSTITUTION NUMBER			40215
HUE: Daylight	Bright Reddish Orange	Bright Orange	Bright Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Good —	Normal — Good — Good —	Normal B — 80 — —
OTHER FIBRES Dyeing Staining	Silk: acetic or formic acid Silk and wool practically unstained. Acetate stained	— Silk and wool dyed equal to cotton. Acetate unstained	— Silk and wool dyed lighter than cotton. Acetate slightly stained, nylon stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 3-4 3 5 6 6 2 — 2 —	AATCC 4 4 5 — 6 — (I) 4 — 2 —	AATCC ISO 3-4 2 1 — 4 — (I) 2 — 3 — 3-4 2 3 4-5 5 5-6 2-3 — 2-3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good-very good Practically unaffected Practically unaffected	Cellulose and nylon: neutral, fairly good-good Unaffected Much yellower and duller	Neutral and alkaline: poor Slightly affected Slightly affected Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Leather: occasionally on chrome tannages Reactions on cellulose: H ₂ SO ₄ 10%—olive NaOH 10%—unaffected	See also C.I. Direct Orange 34, 39 and 61 Leather: on chrome tannages Paper: beater dyeing and occasionally for coating Plastics: for colouring casein/ formaldehyde plastics

61	62	62:1	C.I. Direct Orange
Stilbene 40210	Stilbene	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Orange (Direct)	Reddish Orange	Reddish Orange	HUE: Daylight
Normal — — 80 Good 5, 6	Normal — Good — Good —	Slightly different chemically from C.I. Direct Orange 62 but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed much lighter than cotton. Acetate and nylon unstained		OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate		PRINTING
ISO (Direct) 3-4 5 3 — 6 — 2-3 — 2 —	ISO (6) 4-5 5 3-4 — 7 — 3-4 — 4 —	AATCC 5 5 3 — 6 — (II) 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: fairly good Aftertreated (6): fair-fairly good — —	Neutral: fair Alkaline: poor-fair Unaffected Duller		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: beater dyeing Leather: see Leather Dyes section See also C.I. Direct Orange 39 and 60 for dyes of similar properties and usage	Leather: see Leather Dyes section		NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 63-68

C.I. Direct Orange	63	64	65
CHEMICAL CLASS	Trisazo	Polyazo	
C.I. CONSTITUTION NUMBER	25030		
HUE: Daylight	Bright Orange	Bright Orange	Yellowish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Fair —	Normal — Good — Good —	Normal — — Poor at low temperature Very good —
OTHER FIBRES Dyeing Staining	Unweighted and weighted silk Wool dyed lighter than cotton. Acetate unstained	— Silk dyed, wool slightly stained. Acetate unstained	— Silk and wool dyed much lighter than cotton Acetate slightly stained
PRINTING		Cellulose: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 4-5 3 4-5 5 5-6 2-3 — 2-3 —	AATCC 2 4 5 — 7 — (I) 4 4-5 —	ISO 4 4-5 4 6 6-7 7 4 — 4-5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: fair Unaffected Trace yellower Very sensitive to hard water	Cellulose, wool and silk: very good — —	Neutral: good Alkaline: fair Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE			Solubility: fair, unsuitable for package dyeing

66		67	68	C.I. Direct Orange
Azo		Stilbene		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Reddish Orange		Orange	Yellowish Orange	HUE: Daylight
Normal — — Very good —		Normal — Good Fair —	Normal B — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed much lighter than cotton Acetate unstained		Silk and wool dyed much lighter than cotton. Acetate and nylon unstained	Silk dyed lighter than cotton, wool equal to cotton Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate Wool and silk		—	Cellulose: direct	PRINTING
AATCC — — 3 — 5 — (I) 2-3 — — —	ISO 4 4 3 5-6 6 6 3 — 2 —	AATCC 5 5 3 — 6 — (I) 3 — 4 —	ISO 2-3 4 4 6 6-7 6-7 4 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: fairly good — —		Neutral and alkaline: fairly good Unaffected Duller	Neutral and alkaline: very good Slightly affected Practically unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper Leather: see Leather Dyes section		Dyed cold, silk and wool practically unstained Leather: on chrome tannage Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 69-72

C.I. Direct Orange	69	70	71
CHEMICAL CLASS	Disazo	Stilbene	Stilbene
C.I. CONSTITUTION NUMBER	29055	40245	40205
HUE: Daylight	Orange	Dull Reddish Orange	Reddish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Good —	Normal B — — — —	Normal — Good 90 Fairly good —
OTHER FIBRES Dyeing Staining	— Acetate slightly stained	— Silk and wool dyed equal to cotton Acetate slightly stained	— Silk and wool dyed lighter than cotton. Acetate unstained, nylon slightly stained
PRINTING	Cellulose: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4-5 4 4-5 4 4-5 5 2-3 — 2-3 —	ISO 3-4 5 — 6 6-7 6-7 4 — 3 —	AATCC 5 3 2 — 6 — (I) 2-3 2 — ISO 4 4 4 — 6 — 3-4 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: fairly good-good — —	Neutral: fairly good Alkaline: fair — —	Neutral and alkaline: poor — —
NOTES AND NON-TEXTILE USAGE	Paper		

71:1	72	C.I. Direct Orange
Stilbene	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Orange	Yellowish Orange	HUE: Daylight
Slightly different chemically from C.I. Direct Orange 71 but similar in properties and usage Somewhat redder and duller in hue	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: acetic acid Silk and wool dyed equal to cotton Acetate unstained, nylon slightly stained	OTHER FIBRES Dyeing Staining
		PRINTING
	AATCC 1 5 3 — 4 — (I) 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Cellulose: neutral, good Silk: neutral, very good Unaffected Yellower	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: on chrome tannage Paper: beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 73-77

C.I. Direct Orange	73	74
CHEMICAL CLASS	Disazo	Disazo
C.I. CONSTITUTION NUMBER	25200	28255
HUE: Daylight	Bright Reddish Orange (8) Reddish Yellow (10) Yellow (7)	Reddish Orange (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 80 — 7, 8, 10	Normal — Good — Good 8
OTHER FIBRES Dyeing Staining	— Silk dyed equal to cotton, wool slightly lighter. Acetate stained	— Silk and wool dyed lighter than cotton Acetate slightly stained, nylon heavily stained
PRINTING		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 5 5 — 1-2 — (II) 4-5 5 — AATCC (10) 5 5 5 — 2-3 — (II) 3 5 — ISO (8) 4-5 4 3 1 1-2 2 4 4 — ISO (10) 4 4 4 3 3-4 4 4 4-5 — ISO (7) 4-5 1-2 5 1 1-2 3 3 4-5 —	AATCC (8) 4-5 3 4 3 4 4 (II) 3-4 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Developed (8) and (10): neutral and alkaline; very good Coupled (7): neutral, good; alkaline, fairly good Practically unaffected Little yellower, little duller	Neutral: good Much redder and duller Considerably yellower
NOTES AND NON-TEXTILE USAGE	Leather: suede garment leather (developed)	

75	76	77	C.I. Direct Orange			
Monoazo 17840	Monoazo	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER			
Bright Reddish Orange (8) Bright Orange (10)	Reddish Orange (8) Orange (10)	Bright Orange (8)	HUE: Daylight			
Normal A Good — — 8, 10	Normal — Good — Good 8, 9, 10	Normal — Good — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
Silk: Glauber's salt and acetic acid Silk and wool dyed heavier than cotton. Acetate stained, nylon heavily stained	Silk: acetic acid Silk dyed slightly heavier than cotton, wool slightly lighter Acetate sl. stained, nylon dyed	— Silk and wool heavily stained Acetate unstained	OTHER FIBRES Dyeing Staining			
			PRINTING			
AATCC (8) 5 5 5 — 3 — (II) 2-3 5 —	ISO (8) 4 5 4 1 1-2 2 2-3 3 3-4 —	ISO (10) 4 5 4-5 2 2-3 3 3-4 —	AATCC (8) and (9) 5 4 4 — 2 — (II) 4 4 —	AATCC (10) 5 2-3 4 — 2 — (II) 4 4 —	AATCC (8) 4 4 4 — 3 — (II) 4 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good-very good Unaffected Unaffected	Cellulose and silk: neutral, fair-fairly good Much redder —		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
Leather: on chrome tannage	Leather: developed, on chrome suede		NOTES AND NON-TEXTILE USAGE			

C.I. Direct Orange 78-82

C.I. Direct Orange	78	79	80	
CHEMICAL CLASS	Trisazo	Disazo	Disazo	
C.I. CONSTITUTION NUMBER				
HUE: Daylight	Bright Reddish Orange (8)	Orange (8)	Orange (8)	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good 8	Normal C Good — — 8	Normal — Good — Good 8	
OTHER FIBRES Dyeing Staining	 Wool and nylon slightly stained, acetate slightly stained	 Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained	 Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained	
PRINTING				
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) — — 4 — 4-5 — (II) 4 — 4 —	AATCC (8) 4-5 3 4 3 4 4 (II) 4-5 — 4-5 —	ISO (8 on viscose) 5 5 4 — 4-5 5-6 5 — 5 —	AATCC (8) 5 3 5 — 4 — (II) 3-4 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose and silk: neutral, very good Unaffected Unaffected	Cotton: neutral, good-very good Viscose: neutral, very good; alkaline, fair Very much weaker Much yellower	Neutral and alkaline: good-very good Much yellower and duller Much yellower	
NOTES AND NON-TEXTILE USAGE			Reactions on cellulose: H ₂ SO ₄ 10%—dull olive NaOH 10%—no change	

81	81:1	82	C.I. Direct Orange	
Trisazo	Trisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Orange (8)	Orange (8)	Bright Orange (8) Yellowish Orange (10)	HUE: Daylight	
Normal — Good — Good 8	Slightly different chemi- cally from C.I. Direct Orange 81 but similar in properties and usage	Normal A — — — 8, 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained			OTHER FIBRES Dyeing Staining	
			PRINTING	
AATCC (8) 5 4 4 — 3-4 — (II) 4 — 5 —		ISO (8) 4 4 4-5 3 4 4 5 — 5 —	ISO (10) 4 3-4 4-5 5 5-6 6 5 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good–very good Yellower Redder and weaker		Neutral and alkaline: very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: on chrome tannage Reactions on cellulose: H ₂ SO ₄ 10%—olive NaOH 10%—slightly redder, brighter Zn + NH ₄ OH—brownish yellow (on oxidation) + H ₂ SO ₄ 10%—redder, weaker			NOTES AND NON-TEXTILE USAGE	

C.I. Direct Orange 83-88

C.I. Direct Orange	83	84	85
CHEMICAL CLASS	Disazo	Monoazo	Disazo
C.I. CONSTITUTION NUMBER	29090	19100	25440
HUE: Daylight	Yellowish Orange (8 & 9) Bright Reddish Yellow (10) Reddish Yellow (7)	Bright Orange (8)	Bright Yellowish Orange (8) Bright Reddish Yellow (10)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 80 Fair 7, 8, 9 & 10	Normal — — 80 Fairly good 8	Normal — — 80 Poor 8 & 10
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk, wool and nylon dyed much lighter than cotton Acetate slightly stained	— Silk dyed equal to cotton, wool lighter. Acetate unstained	— Silk dyed much lighter than cotton, wool lighter Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8, 9 & 10) 5 3-4 5 — 2 — (II) 3-4 5 — AATCC (7) 3 3 3-4 3 3 — 3 4 —	ISO (8) 4 5 2-3 2 2 3 3-4 — 3-4 —	ISO (8) 4 3 4-5 2 2 2 4 — 4-5 — ISO (10) 3-4 3-4 4 3 4 4 4 — 4-5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Developed (8) and coupled (7): neutral, very good Alkaline (7), fairly good Practically unaffected Practically unaffected	Neutral: fairly good—good Alkaline: poor Unaffected Unaffected	Neutral: good—very good Alkaline: good Unaffected Trace duller
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage		

86	87	88	C.I. Direct Orange
Azo	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Orange (8)	Bright Orange (10) Bright Reddish Orange (8)	Bright Orange (8)	HUE: Daylight
Normal — Good — Good 8	Normal C — — 8 & 10	Normal — Good — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and nylon: suitable	—	—	OTHER FIBRES Dyeing
Silk and wool dyed equal to cotton. Acetate slightly stained, nylon dyed	Silk dyed lighter and yellower than cotton, wool equal and redder. Acetate stained	Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained	Staining
			PRINTING
AATCC (8) 3 3 3 — 3 — (II) 3 — 3 —	ISO (8) 2 4 2 3 3 4 3-4 — 4-5 —	ISO (10) 2 3-4 2 4-5 5 5-6 3-4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose and silk: neutral, good	Neutral: very good Alkaline: fairly good	Neutral: good—very good	OTHER PROPERTIES Dischargeability
Redder Duller	— —	Weaker Duller	Effect of metals — Copper Iron
		Reactions on cellulose: H ₂ SO ₄ 10%—olive brown NaOH 10%—trace redder ZnCl ₂ +NH ₄ OH—yellow (on oxidation)	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 89-94

C.I. Direct Orange	89	90	91		
CHEMICAL CLASS		Disazo	Disazo		
C.I. CONSTITUTION NUMBER		28660			
HUE: Daylight	Reddish Orange (8 & 10)	Bright Orange (8) Bright Yellowish Orange (10)	Reddish Orange (8)		
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good—very good 8 & 10	Normal — — 80 Fair 7, 8 & 10	Normal — Good — Poor 8		
OTHER FIBRES Dyeing Staining	Silk: acetic or formic acid Acetate and nylon slightly stained	— Silk and wool dyed lighter than cotton. Acetate stained	Silk: acetic acid Silk and wool dyed lighter than cotton. Acetate and nylon slightly stained		
PRINTING					
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 3 3-4 4-5 2 3 3 4 — 4-5 —	ISO (7) 4 1-2 3-4 3 3 3 3-4 — 3-4 —	ISO (8) 3 3-4 3 3 3 3 3 — 4 —	ISO (10) 4 4 3 3 3 3 3 — 4 —	AATCC 5 5 5 — 2 — (III) 4 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good—very good — —	Neutral and alkaline (8 & 10): good; (7), fairly good Somewhat duller Somewhat duller Somewhat sensitive to hard water	Cellulose: neutral, good—very good Silk: neutral, fairly good Unaffected Unaffected		
NOTES AND NON-TEXTILE USAGE			Fastness on silk: Light, poor; washing, very good Leather: developed, on chrome suede		

92	93	94	C.I. Direct Orange
Disazo 25085	Stilbene	Trisazo 34960	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Orange (7)	Reddish Orange (3)	Dull Yellowish Orange (3)	HUE: Daylight
Normal — — 20 Fairly good 7	Normal C — — — 3	Normal B — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— —	— Silk and wool slightly stained Acetate unstained	— Silk dyed equal to cotton but yellowish. Wool heavily stained, Acetate stained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with NaOH and disodium ortho- phosphate, then steamed and aftertreated	Cellulose: urea process with NaOH and disodium ortho- phosphate, then steamed and aftertreated	PRINTING
ISO 3 5 4 1 2 2 3 — 4 —	AATCC (3) 1 2 3 — 4-5 — (III) 4 5 —	ISO (3) 1 2 1 4-5 5 5 4-5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Alkaline: good Much browner and duller Trace browner	Neutral and alkaline: fair — —	Neutral: fairly good Alkaline: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 95-101

C.I. Direct Orange	95	96	97
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER		25345	
HUE: Daylight	Yellowish Orange (3)	Dull Yellowish Orange (3)	Yellowish Orange (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 60 Good—very good —	Normal, alkaline — — 100 — 3	Normal B — — — 3
OTHER FIBRES Dyeing Staining	— Acetate stained		 Silk and wool dyed much lighter than cotton. Acetate stained
PRINTING			Cellulose: urea process with NaOH and disodium orthophosphate, then steamed and aftertreated
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) — — — 5 5-6 6 4-5 — 4-5 —	ISO (3) 3 4 3-4 6 6-7 7 4 — 4-5 —	AATCC (3) 3-4 4 5 — 5-6 — (III) 4-5 — 5 — ISO (3) 3-4 4 4 5-6 6-7 7 3 — 4-5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair Alkaline: good — —	Neutral and alkaline with anthraquinone: moderate Unaffected Unaffected Somewhat sensitive to hard water	Neutral: fairly good Alkaline: good — —
NOTES AND NON-TEXTILE USAGE			

98	99, 100	101	C.I. Direct Orange
Disazo		Disazo 22190	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Orange (3)	Orange	Bright Reddish Orange (on wool) Artificial light: considerably brighter	HUE: Daylight
Normal — — 60 Good—very good 3	Ergan Soga, see C.I. Direct Yellow 72. Batik — — — — —	— — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
—	—	Wool: neutral or slightly acid bath	OTHER FIBRES Dyeing
Acetate stained	—	Acetate slightly stained	Staining
			PRINTING
ISO (3) — — — 5 6 6 4-5 — 4-5 —		AATCC (on wool) — 4 — — 4-5 — (II) 5 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fair Alkaline: fairly good — —	— — —	— — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Fast to boiling water and washing	For dyeing wool, silk and nylon	NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 102-107

C.I. Direct Orange	102	102:1	103	104
CHEMICAL CLASS	Disazo	Disazo	Azo (stilbene)	Monoazo
C.I. CONSTITUTION NUMBER	29156			21571
HUE: Daylight			Reddish Orange	Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal, neutral or sl. alk. bath — — — Very good —	Chemically not identical with C.I. Direct Orange 102 but very similar in properties and uses	Normal — Very good 80-100 Good 3	Ergan Soga, Batik See C.I. Direct Yellow 72 — — —
OTHER FIBRES Dyeing Staining	— Wool dyed lighter than cotton in bath with Na ₂ SO ₄ . Acetate slightly stained		— Acetate stained	—
PRINTING			Cellulose: urea process	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3-4 3-4 5 3 3 3 4-5 4 4-5 3-4		ISO (3) 2-3 2 2-3 3-4 4 4-5 3-4 4 4 5	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: fair Little duller Little duller Slightly sensitive to hard water		Neutral and alkaline: 4 — —	
NOTES AND NON-TEXTILE USAGE				

105	106	107	C.I. Direct Orange
Trisazo	Polyazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Orange→Bright Yellowish Orange	Bright Yellowish Orange Artificial light: redder and brighter	Bright Orange Artificial light: redder	HUE: Daylight
Normal — Very good 60 Good 3, 4	Normal A Good 80 Very good 5	Normal B Very good — Very good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acetic acid Acetate and triacetate unstained Nylon and polyester, slightly stained	— Acetate slightly stained, nylon stained	Silk: neutral bath Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: direct with urea and discharge processes	Cellulose: direct and discharge processes	Cellulose: direct and discharge	PRINTING
ISO (Direct) 3-4 4 5 5-6 6 6 3-4 3-4 3 3	ISO (Direct) 5 3-4 5 6 7 7 (40°C) 3-4 3 4 2-3	ISO (Direct) 4-5 4-5 3 6-7 7 7-8 (40°C) 4 2-3 (40°C) 4 2	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: very good Slightly affected Unaffected	Neutral and alkaline: very good Unaffected Unaffected	Very good 5 4-5	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Covers irregular quality viscose yarn Reactions on cellulose: H ₂ SO ₄ 10%—navy blue HCl 10%—khaki, NaOH 10%—scarlet Leather Paper	Leather: see Leather Dyes section		NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 108–113

C.I. Direct Orange	108	109	110
CHEMICAL CLASS	Disazo		Azo
C.I. CONSTITUTION NUMBER	29173		
HUE: Daylight	Bright Reddish Orange	—	Yellowish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Very good 50 Good —	This C.I. Generic name is no longer in use —	Normal A Very good 100 Good 3
OTHER FIBRES Dyeing Staining	Silk and wool: with Glauber's salt and acetic acid Silk, wool and nylon slightly stained. Acetate unstained		Silk and wool slightly stained Acetate and nylon unstained
PRINTING	Cellulose and silk: urea process		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO 4 5 2–3 2 2 3 2 — 2 —		AATCC 4 4 4 4 4–5 5 (II) 3 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good Slightly duller Unaffected		Neutral and alkaline: 2 Slightly redder —
NOTES AND NON-TEXTILE USAGE	Leather: vegetable, chrome and semi-chrome tannages Paper: beater dyeing		Urea formaldehyde resin finish improves light fastness

111	112	113	C.I. Direct Orange
Azo	Disazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Orange	Bright Reddish Orange	Orange	HUE: Daylight
Normal — 3 — — —	Normal B Good 100 Good 5	Normal A Very good 60 Very good 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
	ISO — — 4 3 3-4 3-4 4 3 3-4 3	ISO (5) — — 4 3 3 3 5 3-4 5 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —	Neutral: good Alkaline: fairly good 3 —	5 5	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Orange 114-117

C.I. Direct Orange	114	115	116	117
CHEMICAL CLASS	Monoazo			Trisazo
C.I. CONSTITUTION NUMBER	—			—
HUE: Daylight	Yellowish Orange	Orange		Reddish Orange
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		Normal — —	This C.I. Generic name is discontinued, dyes formerly listed under it now appear under C.I. Direct Orange 114	Normal B Good 100 Good 5
OTHER FIBRES Dyeing Staining		— Acetate stained, nylon heavily stained, polyester slightly stained		— Wool, nylon and acetate slightly stained
PRINTING				Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO 4-5 4 2 — — — 4 2-3 4 2		ISO Direct — 2 4 5 6 — (40°C) 4 3 4 4 ISO (5) — 2 4 4 5 — (40°C) 4-5 3 5 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: good Alkaline: fairly good — —		Neutral: good Alkaline: fair Slightly affected —
NOTES AND NON-TEXTILE USAGE	Paper: beater dyeing, light fastness good; chlorine, poor			

C.I. Direct Red	1	2	2:1
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22310	23500	
HUE: Daylight	Bluish Red	Bright Red	Bright Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 80-100 — Chromium fluoride	Normal (alkaline) C Good 80 — —	Slightly different chemically from C.I. Direct Red 2, but similar in properties and usage
OTHER FIBRES Dyeing Staining	Silk and wool: with Glauber's salt or acetic acid. Also by metachrome method. Nylon: neutral bath Silk and wool dyed equal to cotton. Acetate stained, nylon dyed	Wool and silk: neutral bath Nylon, linen and jute Silk and wool dyed equal to cotton. Acetate stained, nylon heavily stained	
PRINTING	Silk: urea process with disodium orthophosphate Nylon: with resorcinol, pyridine and ammonium tartrate	Cellulose: urea process with disodium orthophosphate Wool: suitable Nylon: ammonium tartrate	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC ISO ISO 4 3-4 3-4 4 4 4 3-4 3 3-4 — 2 2 4 2-3 2-3 — 3-4 3-4 (I) 2 2 2-3 — — — 3-4 2 3 — — — *Aftertreated with chromium fluoride	AATCC ISO 1 1-2 4 4 3 3 — 1 2 1 — 1 (I) 1 2 — — 2 2 — —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Alkaline: fairly good Practically unaffected Little duller Sensitive to hard water	Neutral: fairly good Alkaline: fair Little yellower Practically unaffected Sensitive to hard water	
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section. Paper: beater dyeing. Heavy metal salts have limited use as pigments. Fastness on nylon: light, 5, 5-6, 6; washing, 4. Important for unions of cellulosic fibres and wool, and on wool alone. Fastness on wool: alkalis, v. good; carbonising, fairly good; perspiration, v. good; stoving, v. good.	Leather: on chrome tannage. Paper: beater dyeing. Fastness properties: NaOH 1%, good; H ₂ SO ₄ 1%, poor; light, good; water, good. Biological stain and indicator. Unsuitable for goods to be given antirease finishes. Reactions on cellulose: H ₂ SO ₄ 10%, greenish black; NaOH 10%, redder.	

C.I. Direct Red 3-8

C. I. Direct Red	3	4	5	
CHEMICAL CLASS	Monoazo	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	15080	29165		
HUE: Daylight	Bluish Pink	Bright Yellowish Red	Bordeaux	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — 60 Very good —	Normal B Good 80 — —	Normal — Good — Good —	
OTHER FIBRES Dyeing Staining	— Wool and silk dyed lighter than cotton Acetate unstained	Silk: Glauber's salt and acetic acid Nylon: Formic acid Wool and silk reserved if unions with cotton dyed at low temperature. Nylon heavily stained	Silk: from a neutral bath Wool and silk dyed as cotton Nylon heavily stained, acetate slightly stained	
PRINTING		Cellulose and natural silk: direct by urea process		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 5 3 2 2 2 1 — 1 —	AATCC 4-5 4-5 3 — 2 — (I) 3 3 —	ISO 4-5 4-5 3 2 2-3 3 2 — 2 —	AATCC 3 5 4 — 5 — (I) 2 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good —very good Somewhat weaker, Unaffected	Neutral and alkaline: fair— fairly good Little duller Practically unaffected	Cellulose: good Silk: good Yellower Duller	
NOTES AND NON-TEXTILE USAGE	Paper	Leather: see Leather Dyes section Paper: beater dyeing	Leather: occasional use on chrome tannage	

6	7	8	C.I. Direct Red
Disazo 27130	Disazo 24100	Disazo 28105	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red	Bluish Red	Bright Bluish Red	HUE: Daylight
Normal — — — —	Normal (alkaline) C Good 80 — —	Normal A — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Wool and silk from a neutral or weakly acid bath Wool dyed as cotton, nylon heavily stained, acetate unstained to heavily stained	Wool dyed as cotton, acetate unstained	OTHER FIBRES Dyeing Staining
	Nylon: direct with resorcinol and urea for solubilising and ammonium tartrate		PRINTING
ISO 5 5 3 3 3 3 1 2 —	AATCC 1 4 3 — 2-3 — (I) 3 2 —	ISO 1-2 4 3 1 1 1 2 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fair Alkaline: poor-fair — —	Neutral: good Alkaline: fairly good Bluer Somewhat duller and weaker	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Microscopic stain	Paper Unsuitable for materials to be given an antcrease finish Reactions on cellulose H ₂ SO ₄ 10% — blue NaOH 10% — unchanged	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 9-13

C.I. Direct Red	9	10	10:1
CHEMICAL CLASS	Azo-thiazole	Disazo	Disazo
C.I. CONSTITUTION NUMBER		22145	
HUE: Daylight	Bluish Pink	Bordeaux	Bordeaux
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — — — —	Normal C Good-very good 80 — —	Slightly different chemically from C.I. Direct Red 10, but similar in properties and usage
OTHER FIBRES Dyeing Staining	— Wool dyed lighter than cotton, nylon dyed, acetate unstained	— Wool and silk dyed as cotton, nylon heavily stained, acetate stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC 2 3 5 — 3-4 — (II) 1 — 3 —	ISO 4 4 4 3 3 4 2 — 2 —	AATCC 3 1 3 — 2 — (I) 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: fair Markedly affected Markedly affected	Neutral and alkaline: good Somewhat yellower and duller Somewhat bluer and duller Very sensitive to hard water	
NOTES AND NON-TEXTILE USAGE	Paper	Biological stain Leather	

11	12	13	C.I. Direct Red
Azo-thiazole		Disazo 22155	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Pink	Red	Bordeaux	HUE: Daylight
Normal A — — — —	— — — — — —	Normal C Very good 80-100 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton. Acetate unstained	—	Silk: Glauber's salt Nylon Silk dyed lighter than cotton, wool equal to cotton. Acetate stained, nylon dyed	OTHER FIBRES Dyeing Staining
Cellulose and silk: urea process with disodium orthophosphate		Cellulose: urea process Cotton and silk: direct and discharge	PRINTING
AATCC ISO 3-4 3 3 2 5 3-4 — 2 3 2 — 2 (II) 1 4 — — 3 3-4 — —		AATCC ISO 1 1 5 4 2 3 — 2 4-5 2-3 — 3 (I) 2 2 — — 3 2 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fair Considerably affected Considerably affected		Cellulose: neutral and alkaline, fairly good Silk: neutral, very good Somewhat yellower Little bluer, little duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Leather: see Leather Dyes Section	Leather: occasionally on chrome tannage Paper: beater dyeing Fastness on nylon: Light 3, 4, 4-5; alk. perspiration, 4-5; washing, 4-5	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 14-19

C.I. Direct Red	14	15	16
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	29170	23510	27680
HUE: Daylight	Bright Red	Red	Bordeaux
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — 80 — —	Normal — — — — —	Normal A Fairly good 60 — —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed lighter than cotton. Acetate slightly stained	Silk —	— Silk dyed lighter than wool, wool equal to cotton. Acetate stained, nylon dyed
PRINTING			Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO 4-5 5 3 3 3 4 1-2 — 1-2 —	ISO 3 5 3 1 2 3 3-4 — 2 —	AATCC 4 3 3 — 1-2 — (I) 1 1 — ISO 4 3-4 3-4 1 2 2 1-2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: moderate Unaffected Unaffected Somewhat sensitive to hard water	Neutral: fairly good Alkaline: fairly good-good — —	Neutral and alkaline: fairly good Unaffected Practically unaffected
NOTES AND NON-TEXTILE USAGE	Paper	Microscopic stain	Leather: see Leather Dyes section Paper: beater dyeing, light fastness, poor

17	18	19	C.I. Direct Red
Disazo 22150	Disazo 22280		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red	Bluish Red→Bordeaux	Bluish Red	HUE: Daylight
Normal C Good 40-60 — —	Normal C — — —	Normal C — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral bath Silk dyed equal to cotton, wool heavier. Acetate and nylon stained	Silk and wool dyed equal to cotton. Acetate unstained, nylon dyed	Wool dyed heavier than cotton. Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 1 3 3 — 1-2 — (I) 1 1 — ISO 1-2 5 2 1 1-2 2 1-2 — 1-2 —	ISO 4 4-5 4 1 1-2 2 2-3 — 3 —	ISO — — 4 1 1 1 2 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose: neutral and alkaline, fairly good Silk: neutral and alkaline, very good Unaffected Unaffected	Good — —	Neutral and alkaline: fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Stable in Na ₂ S and can be used with sulphur dyes	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 20-25

C.I. Direct Red	20	21	22
CHEMICAL CLASS	Monoazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	15075	23560	23565
HUE: Daylight	Bluish Pink	Yellowish Red	Bluish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fairly good 40-80 Good —	Normal — — — — —	Normal — — — — —
OTHER FIBRES Dyeing Staining	Nylon: acetic acid Silk and wool dyed heavier than cotton. Acetate unstained, nylon heavily stained	Silk	Silk
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 2 5 4 — 2 — (I) 1 — 1 —	ISO 5 4-5 4 2 2 2 1-2 — 1-2 —	ISO 2 4 3 1 1 1 1-2 — 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose: neutral, good—very good; alkaline, fairly good—good Silk: neutral, good Practically unaffected Practically unaffected		Neutral, fair; alkaline, poor-fair
NOTES AND NON-TEXTILE USAGE	Leather Paper: beater dyeing		

23	24	25	C.I. Direct Red
Disazo 29160	Disazo 29185		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Red	Red		HUE: Daylight
Normal C Very good 80-100 — —	Normal B Good 100 — —	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Red 24	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon heavily stained. See notes	— Silk dyed lighter and wool slightly lighter than cotton. Acetate unstained, nylon heavily stained		OTHER FIBRES Dyeing Staining
Cellulose and silk: urea process with disodium orthophosphate	Cellulose: urea process		PRINTING
AATCC 5 5 3 — 2-3 — (I) 4 2 —	ISO 5 5 3 2 2-3 3-4 2 2 —	AATCC 5 5 3 — 3 — (I) 4 2 —	ISO 4-5 4-5 3 2 2-3 3-4 2 1-2 —
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fairly good Somewhat duller Practically unaffected	Neutral and alkaline: fairly good Somewhat weaker Somewhat weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Dyed cold silk and wool almost unstained Leather: see Leather Dyes section Heavy metal salts have pigment usage for paper coating Paper: beater dyeing. Gives good backwaters Miscellaneous use on Cellophane and for colouring match heads See also C.I. Direct Red 24	Similar in general properties and usage to C.I. Direct Red 23, but somewhat brighter in hue and more soluble in water Leather: see Leather Dyes section Heavy metal salts have pigment usage for paper coating Paper: beater dyeing, gives good backwaters. Fastness properties: NaOH 1%, H ₂ SO ₄ 1%, H ₂ O and Light-good		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 26-30

C.I. Direct Red	26	26:1	27
CHEMICAL CLASS	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	29190		
HUE: Daylight	Bluish Red	Bluish Red	Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 100 — —	Slightly different chemically from C.I. Direct Red 26 but similar in properties and usage	Normal C — 100 — 6
OTHER FIBRES Dyeing Staining	Wool: neutral bath Silk: Glauber's salt and acetic acid Nylon: Formic acid Silk dyed much lighter, wool lighter than cotton. Acetate slightly stained, nylon heavily stained. See notes		Wool dyed lighter than cotton Acetate stained
PRINTING	Cellulose: urea process		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 3 5 2 2 2-3 3 (II) 2 3 — 2 2 —	ISO 4 4 2-3 1-2 2 2-3 2 — — 2 — —	AATCC AATCC ISO ISO Direct (6) Direct (6) 3 3 5 5 3-4 3 3 3 4 4-5 3 3-4 2 2 2 2 3 3 3 3 4 4 4 4 (II) 3-4 (II) 4 4 4-5 4 4-5 4-5 4-5 — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: fairly good Practically unaffected Practically unaffected		Fairly good Slightly affected Practically unaffected
NOTES AND NON-TEXTILE USAGE	Wool and silk reserved at low temperatures Leather: see Leather Dyes section Paper: beater dyeing		Aftertreatment with copper sulphate improves the light fastness

28	29	30	C.I. Direct Red	
Disazo 22120	Disazo 22305	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Yellowish Red	Bordeaux	Bright Bluish Red	HUE: Daylight	
Normal (alkaline) C Good 80 — —	Normal — — — — 1, 7	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Silk and wool: neutral bath Silk and wool dyed equal to cotton but yellower Acetate stained, nylon heavily stained		Silk dyed equal to cotton, wool heavily stained, acetate unstained	OTHER FIBRES Dyeing Staining	
			PRINTING	
AATCC 1 3 3 — 2 — (I) 1 — 3 —	ISO 1 3 3 1 1 1 2 — 2 —	AATCC 5 4 — — — — 2 — 1-2 —	AATCC 4 2 5 — 4 — (I) 3 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good Little yellower, trace duller Little yellower Somewhat sensitive to hard water	— — —	Neutral: fairly good — — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Traditional name “Congo Red” Biological stain Indicator: red to deep blue from pH 3 to 5 (approx.) Paper: beater dyeing. Fastness properties: NaOH 1%, good; H ₂ SO ₄ 1% poor: Light, fair; water, good The first synthetic organic dye to have direct affinity for cellulose	Fastness to washing and water is improved by aftertreatments		NOTES AND NON-TEXTILE USAGE	

C.I. Direct Red 31-35

C.I. Direct Red	31	32	33
CHEMICAL CLASS	Disazo	Polyazo	Disazo
C.I. CONSTITUTION NUMBER	29100	35790	22306
HUE: Daylight	Bright Bluish Red	Bluish Red (Direct)	Bordeaux (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Very good 40-60 — —	Normal — Fairly good — Fairly good 6	Normal — — 60-80 Fairly good-good 1, 3, 7
OTHER FIBRES Dyeing Staining	Silk: neutral Silk dyed weaker than cotton, wool equal depth Acetate stained, nylon dyed	Silk and wool: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate slightly stained, nylon stained	 Silk and wool dyed equal to cotton Acetate slightly stained
PRINTING	Cellulose: urea process		
FASTNESS PROPERTIES Method	AATCC	ISO	AATCC
Acid (organic)	3-4	3-4	4
Alkali	4	4	4-5
Hot pressing	2	2	4-5
Light: $\frac{1}{2}$ normal	—	2	—
normal	1	2	4
2 × normal	—	2	—
Washing — alteration	(I) 1	1-2	2
staining	—	—	—
Water — alteration	1-2	1-2	4
staining	—	—	—
OTHER PROPERTIES Dischargeability	Cellulose: neutral, fairly good —good; alkaline good Silk: neutral, fair-fairly good	Neutral: fairly good-good	Direct and coupled: neutral, fairly good; alkaline, fairly good- good
Effect of metals — Copper Iron	Duller and weaker Practically unaffected	Little bluer Duller	
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn Leather: occasionally on chrome tannage Paper: beater dyeing	Wet fastness improved by formaldehyde aftertreat- ment Leather: occasionally on chrome tannage Paper: beater dyeing	Leather Paper

33:1	34	35	C.I. Direct Red
Disazo	Disazo 23570	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bordeaux	Red	Bluish Red	HUE: Daylight
Slightly different chemically from C.I. Direct Red 33 but similar in properties and usage	Normal — — — Good —	Normal B — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk and wool dyed lighter than cotton. Acetate stained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process with disodium orthophosphate	PRINTING
	ISO 1 4 2-3 — 1 — 1-2 — 1 —	ISO 5 4 3-4 2 3 3 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: poor Alkaline: fair	Neutral and alkaline: good Practically unaffected —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Biological stain	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 36-41

C.I. Direct Red	36	37	38
CHEMICAL CLASS	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	29220	22240	
HUE: Daylight	Bright Red	Red	Bordeaux (on leather)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Very good —	Normal A Good 80 — —	
OTHER FIBRES Dyeing Staining	— Silk and wool almost unstained Acetate unstained	Silk and wool: neutral or acetic acid Wool and silk dyed. Acetate stained, nylon dyed	
PRINTING		Cellulose: Direct and discharge Nylon: with resorcinol and ammonium tartrate	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4-5 5 — — 2-3 — 2-3 — 3 —	AATCC 3 5 4 — 2-3 — (I) 1 1 — ISO 3-4 4 3-4 1-2 2 2 1-2 — 1-2 —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fair-fairly good — —	Cellulose: neutral, good; alkaline, poor-fair Wool and silk: good Unaffected Somewhat duller and weaker Somewhat sensitive to hard water	
NOTES AND NON-TEXTILE USAGE		Fastness on wool: Alkali, good; Carbonising, very good; Light 4-5; Milling, fairly good-good; Perspiration, poor; Stoving, poor; Washing, good-very good. Leather: see Leather Dyes section Paper: beater dyeing	Leather: see Leather Dyes section

39	40	41	C.I. Direct Red
Disazo 23630	Polyazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red	Dull Yellowish Red	Bluish Red	HUE: Daylight
Normal A Fairly good 80 — —	Normal — Good — Good —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool: neutral or acetic acid	—	—	OTHER FIBRES Dyeing
Silk and wool dyed, acetate stained, nylon dyed	Wool heavily stained, acetate slightly stained		Staining
Cellulose: direct and discharge Nylon: with ammonium tartrate for fixing	—	—	PRINTING
AATCC ISO	AATCC	AATCC	FASTNESS PROPERTIES Method
5 3	3	5	Acid (organic)
5 3-4	4	4-5	Alkali
3 3	4	4-5	Hot pressing
— 2	—	2-3	Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal
2 2	4	3	normal
— 3	—	3-4	2× normal
(I) 2 1-2	(I) 3	(II) 3-4	Washing — alteration
— 2	4	—	staining
2-3 2	—	3-4	Water — alteration
— —		—	staining
Cellulose: neutral, good; alkaline, fair Wool and silk: very good	Cellulose: neutral, good Wool: neutral, very good		OTHER PROPERTIES Dischargeability
Unaffected Unaffected Sensitive to hard water			Effect of metals — Copper Iron
Fastness on wool: alkali, good; Carbonising, very good; Light, 4-5; Milling, fairly good-good; Perspi- ration, good; Stoving, poor; Wash- ing, good-very good Leather: see Leather Dyes section Paper: beater dyeing			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 42-46

C.I. Direct Red	42	43	43:1
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22180	22205	
HUE: Daylight	Dull Bluish Red	Bordeaux	Bordeaux
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Fair —	Normal — Good 80 Good —	Slightly different chemically from C.I. Direct Red 43, but similar in properties and usage
OTHER FIBRES Dyeing Staining	 Silk and wool dyed lighter than cotton. Acetate stained	 Silk slightly lighter than cotton, wool equal. Acetate stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 5 3 1 1 2 1 — 1-2 —	AATCC 2 5 4 — 4-5 — (I) 2 — 2-3 —	ISO 2 4 2-3 2 2 3 1 — 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair Alkaline: moderate Trace duller Unaffected	Neutral and alkaline: fairly good Browner Unaffected	
NOTES AND NON-TEXTILE USAGE	Unsuitable for antirese finishes because hue much bluer Leather: see Leather Dyes section Paper: beater dyeing	Leather: on chrome tannage Paper: occasionally for beater dyeing Unsuitable for antirese finishes, hue much duller	

44	45	46	C.I. Direct Red
Disazo 22500	Azo-thiazole 14780	Disazo 23050	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Bluish Red→Reddish Violet	Bluish Pink→Bluish Red	Bright Bluish Red	HUE: Daylight
— — —	Normal B Good	Normal A —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion
— — —	40-60 — —	60 — —	Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool: neutral or acid		Silk: acetic acid	OTHER FIBRES Dyeing
—	Silk lighter than cotton, wool equal depth to cotton. Acetate and nylon slightly stained	Silk dyed lighter than cotton, wool equal. Acetate stained, nylon slightly stained	Staining
		Cellulose, silk and wool: urea process	PRINTING
	AATCC ISO	AATCC ISO	FASTNESS PROPERTIES Method
	5 4-5	3 3-4	Acid (organic)
	2 2	4 4	Alkali
	3 3	5 2-3	Hot pressing
	— 2	— 2	Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal
	3 2	3-4 2	normal
	— 3	— 3	2 × normal
	(I) 1 1-2	(I) 1 1-2	Washing — alteration
	— —	— —	staining
	2 1-2	3 1-2	Water — alteration
	— —	— —	staining
	Neutral and alkaline: fairly good	Neutral and alkaline: good	OTHER PROPERTIES Dischargeability
	Somewhat duller and yellower	Practically unaffected	Effect of metals — Copper
	Somewhat duller and yellower	Practically unaffected	Iron
		Somewhat sensitive to hard water	
Mainly for cellulose-wool unions with only moderate all round fastness On wool only moderate fastness, but good fastness to carbonising Leather: see Leather Dyes section Paper: beater dyeing	Leather: see Leather Dyes section Paper: occasionally for beater dyeing Miscellaneous uses include colouring soap and as a microscopic stain	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 47-52

C.I. Direct Red	47	48	49
CHEMICAL CLASS	Monoazo	Monoazo	Disazo
C.I. CONSTITUTION NUMBER	14985	14930	25375
HUE: Daylight	Bluish Pink	Bright Bluish Pink	Bluish Pink
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 40 Good —	Normal — — 40 Very good —	Normal — — 40 Very good —
OTHER FIBRES Dyeing Staining	— Silk dyed somewhat lighter than cotton, wool slightly heavier. Acetate unstained	— Silk dyed equal to cotton, wool heavier. Acetate stained	— Silk dyed much lighter than cotton, wool equal. Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4 1 3 — 3 — (I) 1 1 —	ISO 3—4 3 2—3 3 3 3 1 1—2 —	ISO 3 5 3—4 3 3 3 1 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good Trace duller Unaffected	Neutral and alkaline: good—very good Much duller and weaker Somewhat duller and weaker	Neutral and alkaline: poor Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage Paper: beater dyeing Moderately stable to anti-crease finishes, weaker and bluer but light fastness unaffected	Fluorescent stain for microscopy	

50		51	52	C.I. Direct Red
Trisazo 31525		Monoazo 14990	Disazo 22290	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bordeaux (Direct)		Bluish Pink	Bluish Red (Direct)	HUE: Daylight
Normal — — Good 6		Normal A Good 40 — —	Normal — — — — 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk dyed equal to cotton, wool heavier. Acetate slightly stained Nylon heavily stained		OTHER FIBRES Dyeing Staining
				PRINTING
ISO Direct 2 4 2-3 2 2 3 1 — 1 —	ISO (6) 2 4 3 — 2 — 2-3 — 1-2 —	AATCC 4-5 1 3 — 4 — (I) 1 1 —	ISO 3-4 5 3 3 3 4 1-2 — 1-2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —		Good Weaker Yellower	Neutral: good Alkaline: fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Covers irregular quality viscose yarn Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 53-58

C.I. Direct Red	53	54	55
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22405	29215	27780
HUE: Daylight	Bright Bluish Red	Bluish Red	Bluish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Fair —	Normal — — 80 Fair —	Normal — — 100 Good —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon heavily stained	— Silk and wool dyed lighter than cotton. Acetate unstained	— Silk dyed lighter than cotton, wool equal. Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 3 3-4 5 — 2 — (I) 2 1 —	ISO 3 3 2 — 2 — 1-2 1 —	ISO 4 4 3 2 2 3 1 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good Unaffected Unaffected	Neutral: good Alkaline: fairly good Unaffected Unaffected	Fair Unaffected Unaffected Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Dyed cold silk and wool reserved Leather: occasional use on chrome tannage Paper: beater dyeing	Paper	

56	57	58	C.I. Direct Red
Disazo 23600	Disazo 26720	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red	Bright Yellowish Red	Bluish Red	HUE: Daylight
Normal — — 80 Fairly good —	Normal — — 80 Good —	Normal C — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton. Acetate stained	— Silk and wool dyed lighter than cotton. Acetate stained	— Silk and wool dyed lighter than cotton. Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2-3 4 3 2 2 3 1 — 1 —	ISO 4 4 3 3 3 4 1-2 — 1-2 —	ISO 3 3 3 3-4 4 4-5 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Fair — Unaffected Unaffected Somewhat sensitive to hard water	Neutral: fair Alkaline: fairly good-moderate Somewhat duller Unaffected	Good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Unsuitable for goods to be given antcrease finishes Also used for colouring soap			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 59—63

C.I. Direct Red	59	60	61
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22420	22200	23040
HUE: Daylight	Bluish Red	Bluish Red	Bluish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 100 Fair —	Normal — — — Very good —	Normal C — 80–100 — —
OTHER FIBRES Dyeing Staining	— Silk dyed equal to cotton, wool lighter Acetate unstained		Silk: Glauber's salt and acetic acid Silk and wool dyed equal to cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 3–4 3–4 3 4 4 1–2 — 3 —	ISO 3 3–4 3 1 1 2 2–3 — 2 —	ISO 2 3–4 3–4 1 1 1 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good Bluer and weaker Somewhat bluer and duller Very sensitive to hard water	Neutral: good Alkaline: fairly good–good — —	Fairly good Unaffected Slightly affected
NOTES AND NON-TEXTILE USAGE			Paper

62	63	C.I. Direct Red
Disazo 29175		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red	Bright Yellowish Red (Direct)†	HUE: Daylight
Normal B — 80 — —	Normal C — — 3, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acid bath Silk and wool dyed lighter than cotton Acetate unstained, nylon stained		OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate Silk and wool: urea process	Viscose: urea process	PRINTING
AATCC ISO 5 4-5 4 4 3 3 2 2 3 2-3 — 3 (II) 3 3 — — 3-4 3 — —	AATCC AATCC AATCC ISO ISO ISO Direct (3) (4) Direct (3) (4) 5 3 — 5 4-5 4 4 3-4 — 4-5 3-4 3 4 5 4-5 2 3 4 — — — 3 3 4 2-3 3 2-3 3 4 4-5 3 4 3-4 4 5 5 (II) 3 (II) 3-4 (II) 3-4 4-5 4-5 4-5 — — — — — — 3-4 4-5 5 3-4 4-5 4-5 — — — — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Cellulose: fairly good Silk: neutral, fairly good; alkaline, good Practically unaffected Slightly yellower	Good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Covers irregular quality viscose Leather: see Leather Dyes section Paper: occasionally for beater dyeing	†Hue becomes duller with copper sulphate aftertreatment Covers irregular quality viscose yarn Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 64—68

C.I. Direct Red	64	65	66
CHEMICAL CLASS	Monoazo	Monoazo	Monoazo†
C.I. CONSTITUTION NUMBER	17875	17870	—
HUE: Daylight	Red	Yellowish Red	Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 60 Good—very good —	Normal — — 60 Good—very good —	Normal — — 60 Very good —
OTHER FIBRES Dyeing	—	—	—
Staining	Acetate slightly stained	Acetate slightly stained	Acetate somewhat stained
PRINTING			
FASTNESS PROPERTIES Method	ISO	ISO	ISO
Acid (organic)	3–4	4–5	4–5
Alkali	3	4	4
Hot pressing	3	4	3–4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	3	3–4	2–3
normal	3	3–4	2–3
2 × normal	3–4	4	3
Washing — alteration	1–2	2	1
staining	—	—	—
Water — alteration	1	2	1
staining	—	—	—
OTHER PROPERTIES Dischargeability	Fair—fairly good	Neutral: fairly good—good Alkaline: fair—fairly good	Fairly good
Effect of metals — Copper Iron			
NOTES AND NON-TEXTILE USAGE			†Derived from dehydrothio- <i>p</i> -toluidine

67	67:1	68	C.I. Direct Red
Disazo 23505	Disazo	Disazo 23515	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red	Bright Yellowish Red	Bright Red	HUE: Daylight
Normal — — Good —	Slightly different chemically from C.I. Direct Red 67, but similar in properties and usage	Normal — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2 5 3 1 1-2 2 3 — — —		ISO 2 5 — 1 1-2 2 2-3 — 1-2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{3}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good		Moderate	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 69—73

C.I. Direct Red	69	70	71
CHEMICAL CLASS	Monoazo	Monoazo	
C.I. CONSTITUTION NUMBER	14785	16081	
HUE: Daylight	Bordeaux	Yellowish Pink→Yellowish Red	Bright Bluish Pink
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good —	Normal — — — — —	Normal A — — — —
OTHER FIBRES Dyeing Staining			Silk and wool dyed lighter than cotton Acetate unstained
PRINTING			Cellulose and silk: urea process with disodium orthophosphate
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO 4 3 3 2 2 3 1 — 1 —	ISO 4 — 2-3 1 1-2 2 2-3 — 1 —	AATCC ISO 3 3 2 2 5 4 — 2 3 2 — 2 (II) 2 3 3 2-3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Moderate 	Moderate 	Fair Slightly affected —
NOTES AND NON-TEXTILE USAGE			Paper

72	72:1	73	C.I. Direct Red
Disazo 29200	Disazo	Disazo 29180	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red	Bright Red	Bright Red (Direct)	HUE: Daylight
Normal — — 100 Fair —	Slightly different chemically from C.I. Direct Red 72, but similar in properties and usage	Normal — Good — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed lighter than cotton Acetate unstained		Silk and wool: Glauber's salt and acetic acid Silk heavily stained, wool dyed. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 5 3 3 3 4 1-2 — 1-2 —		AATCC Direct AATCC (6) 5 5 5 5 3 5 — — 4 4 — — (II) 2 (II) 2 — 3 5 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Fair Somewhat yellower and duller Unaffected		Neutral: good Slightly duller Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: Occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 74—78

C.I. Direct Red	74	75	76
CHEMICAL CLASS	Disazo	Disazo	Stilbene
C.I. CONSTITUTION NUMBER	22170	25380	40270
HUE: Daylight	Bluish Red	Bright Bluish Pink	Yellowish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Poor —	Normal A — 80 — —	Normal B Good 100 — —
OTHER FIBRES Dyeing Staining	 Wool dyed equal to cotton Acetate stained	 Silk dyed much lighter than cotton, wool slightly lighter. Acetate unstained, nylon slightly stained	Silk: formic or acetic acid Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained
PRINTING		Cellulose: urea process with disodium orthophosphate Wool, silk and nylon: suitable	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 4 1 1 1 2 2 — 1-2 —	AATCC ISO 3 2-3 3 3-4 4 3-4 — 4 5 4-5 — 5 (I) 3-4 2-3 — — 3 2-3 — —	AATCC ISO 5 3 3 4 1 3 — 5-6 5 6 — 6 (I) 4 3 — — 4 3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair Alkaline: fair-fairly good Yellower Unaffected	Good-very good Practically unaffected Practically unaffected	Fair Unaffected Duller
NOTES AND NON-TEXTILE USAGE	Leather Paper	Biological stain Leather: see Leather Dyes section Paper: beater dyeing	Leather: see Leather Dyes section Paper: beater dyeing

76:1	77	78	C.I. Direct Red
Stilbene	Disazo 28110	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Red	Bordeaux	Bordeaux	HUE: Daylight
Slightly different chemically from C.I. Direct Red 76 but similar in properties and usage	Normal A Fairly good 60 — —	Normal A Fairly good 60 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: Glauber's salt and acetic acid Wool: Glauber's salt and ammonium acetate Silk and wool dyed equal to cotton Acetate stained, nylon dyed		OTHER FIBRES Dyeing Staining
	Cellulose: direct	Cellulose: direct	PRINTING
	AATCC ISO 1 3-4 4 5 3 2-3 — 5 3-4 5 — 5 (1) 1 1 — — 1 1 — —	ISO 4-5 5 4-5 4-5 5 5 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: good Alkaline: fairly good—good Unaffected Unaffected Somewhat sensitive to hard water	Neutral: good Alkaline: fairly good Unaffected Unaffected Somewhat sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 79—82

C.I. Direct Red	79	80	80:1																																				
CHEMICAL CLASS	Disazo	Polyazo	Polyazo																																				
C.I. CONSTITUTION NUMBER	29065	35780																																					
HUE: Daylight	Bright Bluish Red	Bright Bluish Pink→Bright Bluish Red	Bright Bluish Pink→Bright Bluish Red																																				
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 80–100 — —	Normal B Good 100 — —	Slightly different chemically from C.I. Direct Red 80 but similar in properties and usage																																				
OTHER FIBRES Dyeing Staining	Silk: acetic or formic acid Silk and wool dyed much lighter than cotton Acetate slightly stained	Silk: acetic or formic acid Silk and wool dyed much lighter than cotton Acetate and nylon unstained																																					
PRINTING	Cellulose: urea process with disodium orthophosphate Wool and silk: suitable	Cellulose: urea process with disodium orthophosphate Silk and wool: suitable																																					
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½–½ normal normal 2× normal Washing — alteration staining Water — alteration staining	<table><tr><th>AATCC</th><th>ISO</th></tr><tr><td>5</td><td>4</td></tr><tr><td>3</td><td>3–4</td></tr><tr><td>5</td><td>3–4</td></tr><tr><td>5</td><td>6</td></tr><tr><td>6</td><td>6</td></tr><tr><td>6–7</td><td>6–7</td></tr><tr><td>(I) 3</td><td>3</td></tr><tr><td>3</td><td>3</td></tr></table>	AATCC	ISO	5	4	3	3–4	5	3–4	5	6	6	6	6–7	6–7	(I) 3	3	3	3	<table><tr><th>AATCC</th><th>ISO</th></tr><tr><td>5</td><td>4</td></tr><tr><td>2</td><td>3</td></tr><tr><td>3</td><td>3–4</td></tr><tr><td>4</td><td>4</td></tr><tr><td>4–5</td><td>4–5</td></tr><tr><td>5</td><td>5</td></tr><tr><td>(I) 3</td><td>3</td></tr><tr><td>3</td><td>3</td></tr></table>	AATCC	ISO	5	4	2	3	3	3–4	4	4	4–5	4–5	5	5	(I) 3	3	3	3	
AATCC	ISO																																						
5	4																																						
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6–7	6–7																																						
(I) 3	3																																						
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4–5	4–5																																						
5	5																																						
(I) 3	3																																						
3	3																																						
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good–very good Practically unaffected Practically unaffected Very sensitive to hard water	Neutral: good Alkaline: fairly good–good Little bluer Yellower																																					
NOTES AND NON-TEXTILE USAGE	Useful for dyeing mixtures of differential dyeing nylon Heavy metal salts have pigment usage Paper: beater dyeing Miscellaneous use for dyeing anodised aluminium and Cellophane Leather: see Leather Dyes section	Good reserve on wool Leather: see Leather Dyes section Paper: beater dyeing																																					

81	81:1	82	C.I. Direct Red
Disazo 28160	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red	Bright Red	Bluish Red→Reddish Violet	HUE: Daylight
Normal A Poor 60 Good —	Slightly different chemically from C.I. Direct Red 81, but similar in properties and usage	Normal B — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral bath Silk and wool dyed equal to cotton. Acetate stained, nylon heavily stained		Silk and wool stained Acetate unstained, nylon slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process used occasionally			PRINTING
AATCC 4 3-4 3 — 4-5 — (I) 1 — 1 —	ISO 4 3 2-3 3-4 4 4-5 1-2 — 1 —	ISO — 4 4 5 6-7 6-7 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose: good Silk, neutral: fairly good-good Little duller, bluer Unaffected		Fair Unaffected Practically unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Levels well on irregular quality viscose Leather: see Leather Dyes section Paper: beater dyeing Biological stain		Stable to antirease finishes Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 83—86

C.I. Direct Red	83	83:1	84
CHEMICAL CLASS	Disazo	Disazo	Polyazo
C.I. CONSTITUTION NUMBER	29225		35760
HUE: Daylight	Bluish Red→Reddish Violet (Direct)	Bluish Red→Reddish Violet	Dull Yellowish Red (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 100 — 4	Slightly different chemically from C.I. Direct Red 83, but similar in properties and usage	Normal — Fair 100 Fairly good 6
OTHER FIBRES Dyeing Staining	 Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained		Silk: acid bath Silk and wool dyed lighter than cotton. Acetate and nylon stained
PRINTING	Cellulose: urea process with disodium orthophosphate		Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC AATCC ISO ISO Direct (4) Direct (4) 4-5 — 3-4 4-5 3-4 — 4 5 4 4-5 3 3-4 — — 6 6-7 6-7 5 7 7 — — 7 7 (II) 2 (II) 4 3 3 — — — — 3-4 4-5 2-3 4-5 — — — —		AATCC AATCC ISO Direct (6) Direct 2-3 5 4 4 2 4 1 5 4 — — 6 4-5 4-5 6-7 — — 7 (I) 2 2 3-4 — — — 2 3 4 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: poor Aftertreated: alk. with anthraquinone, fair Practically unaffected Little duller		Fairly good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Heavy metal salts have pigment usage Leather: see Leather Dyes section Paper: beater dyeing		Covers irregular quality viscose yarn Leather: see Leather Dyes section Paper: beater dyeing and occasionally for coating

84:1	85	86	C.I. Direct Red
Polyazo	Disazo 28180	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Yellowish Red (Direct)	Bluish Red	Bluish Red	HUE: Daylight
Slightly different chemically from C.I. Direct Red 84, but similar in properties and usage	Normal — — 60 Good—very good —	Normal — — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk and wool dyed equal to cotton. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO 4-5 3-4 4-5 4-5 5 5 1-2 — 1-2 —	AATCC ISO 5 4-5 5 4-5 3 4 — 4 4 4 — 4-5 (I) 3 2-3 — 1 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: very good Alkaline: good—very good — —	Cellulose: good—very good Silk: neutral, good—very good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper	Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 87—92

C.I. Direct Red	87	88	89		
CHEMICAL CLASS		Disazo	Disazo		
C.I. CONSTITUTION NUMBER		22360			
HUE: Daylight	Bordeaux	Dull Bluish Red→Bordeaux (Direct)	Yellowish Red		
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — —	Normal B — — — 2, 4	Normal B — — — —		
OTHER FIBRES Dyeing Staining		Silk dyed lighter and wool equal to cotton but somewhat yellower. Acetate stained	Silk and wool heavily stained Acetate unstained		
PRINTING			Cellulose: urea process with disodium orthophosphate		
FASTNESS PROPERTIES Method	ISO	ISO Direct	ISO (4)	AATCC	ISO
Acid (organic)	5	4-5	—	3-4	4
Alkali	2	3-4	—	4	4-5
Hot pressing	3	3	—	5	3
Light: ½—½ normal	4	2-3	—	—	5
normal	4	3-4	4	5-6	5-6
2× normal	4-5	4	—	—	6
Washing — alteration	4	3	4	(II) 2	4
staining	—	—	—	—	—
Water — alteration	2-3	2-3	4-5	4-5	4
staining	—	—	—	—	—
OTHER PROPERTIES Dischargeability	Good	Good—very good		Fairly good—good	
Effect of metals — Copper Iron		Slightly affected Somewhat affected		Affected Practically unaffected	
NOTES AND NON-TEXTILE USAGE	Leather: On chrome and vegetable tannages	Aftertreatment with bichromate and copper sulphate improves the fastness to light, washing and water Leather: see Leather Dyes section		Heavy metal salts have pigment usage Paper	

90	91	92	C.I. Direct Red
Disazo 28170			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red	Bluish Red	Dull Bluish Red (Direct)	HUE: Daylight
Normal — — Good —	Normal — — Very good —	Normal C — 80 — 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk and wool dyed lighter than cotton Acetate unstained	Silk and wool dyed heavier than cotton. Acetate and nylon slightly stained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate		PRINTING
ISO 3 4-5 4 — 4-5 — 2 — 2 —	ISO 3-4 3-4 3 5-6 6 6-7 4-5 — 3 —	AATCC Direct — — 5 — 7 — (I) 2-3 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Good-very good	Direct: fairly good Aftertreated: alk. with anthraquinone: fairly good Slightly affected Somewhat affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper Leather: see Leather Dyes section	Paper Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 93—98

C.I. Direct Red	93	94	95
CHEMICAL CLASS	Polyazo	Polyazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Yellowish Red	Dull Yellowish Red	Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good —	Normal — Good — Good —	Normal — — 80 Fairly good —
OTHER FIBRES Dyeing Staining	 Wool dyed, acetate slightly stained	Silk: neutral or with acetic acid Silk and wool dyed lighter than cotton. Acetate slightly stained, nylon heavily stained	Silk: acetic or formic acid Silk and wool slightly stained Acetate unstained
PRINTING	Cellulose: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4 4 4 — 6 — (I) 3 — 4 —	AATCC 1 5 3 — 5-6 — (I) 3 — 4 —	ISO 2-3 4 3 5 5-6 6 2-3 — 2-3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose: neutral, fairly good—good Wool: neutral, good	Cellulose: neutral, good Silk: neutral, fairly good Unaffected Unaffected	Neutral: good—very good Alkaline: good Unaffected Little weaker Sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Leather: on chrome tannage Paper: beater dyeing	Leather

96	97	98	C.I. Direct Red
	Disazo	Disazo 29230	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bordeaux	Bluish Red (Direct)	Red→Bordeaux	HUE: Daylight
Normal — — — Good —	Normal — Fair — Good 6	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk weakly dyed, wool heavily stained, acetate slightly stained, nylon unstained	— Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 3 4-5 4 — 6-7 — 1-2 — 1 —	AATCC 5 5 2 — 7 — (I) 4* — 1 —	ISO 1-2 4 4 — 6-7 — 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Poor (yellow) Unaffected Duller	Fair	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Stable to anticrease finishes *Washing fastness improved by formaldehyde aftertreatment		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 99—103

C.I. Direct Red	99	100	101
CHEMICAL CLASS	Disazo (metal complex)	Disazo	Disazo
C.I. CONSTITUTION NUMBER	29167		25320
HUE: Daylight	Bluish Red→Bordeaux	Bluish Red	Bluish Pink
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good — — 4	Normal A Good — — —	Normal — — 60 Good —
OTHER FIBRES Dyeing Staining	— Silk dyed lighter than cotton, wool much lighter. Acetate un- stained, nylon slightly stained	Nylon: by padding, with am- monium tartrate Silk and wool dyed equal to cotton. Acetate unstained, ny- lon heavily stained	Silk: suitable Silk dyed much lighter than cotton, wool lighter. Acetate unstained
PRINTING	Cellulose: urea process with disodium orthophosphate	Cellulose: urea process with disodium orthophosphate Silk and nylon: suitable	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 3 5 4 — 5-6 — (II) 3 — — — — —	ISO Direct 3-4 4 4 6-7 7 7 3-4 — 3 4-5 — — —	ISO (4) — — — — 7 — — — — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: fair Unaffected Somewhat affected	Neutral: good-very good Alkaline: good Slightly affected Somewhat bluer and dul- ler	Very good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Paper	Leather: see Leather Dyes section	Paper

101:1	102	103	C.I. Direct Red
Disazo		Trisazo 34025	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Pink	Bordeaux	Dull Bluish Bordeaux	HUE: Daylight
Slightly different chemically from C.I. Direct Red 101 but similar in properties and usage	Normal A — 60 — —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Wool dyed equal to cotton Acetate slightly stained	Silk: suitable	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO 5 2 3 4 4 4-5 4 — 2-3 —	ISO 3 5 2-3 4-5 4-5 5 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Good Unaffected Slightly affected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 104—109

C.I. Direct Red	104	105	106
CHEMICAL CLASS C.I. CONSTITUTION NUMBER			Monoazo (copper complex)
HUE: Daylight	Bright Yellowish Red	Bluish Red	Bluish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good —	Normal — — — Very good —	Normal — — 60 Good —
OTHER FIBRES Dyeing Staining	Silk: suitable —	— Silk dyed much lighter than cotton, wool dyed lighter Acetate unstained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 5 3 4-5 5 5 2 — 2 —	ISO 5 4 5 6 7 7 4 — 2-3 —	ISO 5 3-4 5 5 6 6-7 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good —	Fairly good —	Neutral: fair—fairly good Alkaline: fair —
NOTES AND NON-TEXTILE USAGE		Dyed with salt and tempera- ture control Paper	Paper

107	108	109	C.I. Direct Red
Disazo	Disazo 28165		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red	Bright Bluish Red	Bluish Red	HUE: Daylight
Normal B — — — 4	Normal — — 60 Good —	Normal — — Good affinity at low temp. Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: neutral Silk and wool dyed equal to cotton Acetate unstained	— Silk and wool dyed equal to cotton Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate			PRINTING
AATCC Direct 3 4-5 5 5 6 7 (II) 3 — 4 —	ISO Direct 4 4-5 4 6 7 7 4 — 4 —	ISO 5 5 3-4 4-5 4-5 4-5 1-2 — 1 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Fairly good —	Good Change to bordeaux hue Trace yellower	Neutral: very good Alkaline: good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper and Cellophane	Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 110—115

C.I. Direct Red	110	111	112
CHEMICAL CLASS	Disazo	Stilbene	Stilbene
C.I. CONSTITUTION NUMBER	28370	40290	40290
HUE: Daylight	Bluish Red	Dull Yellowish Red (Direct)	Dull Yellowish Red
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	B	—
Exhaustion	—	Good	Poor
Temp. of maximum affinity °C	—	80–95	100
Levelling	—	—	Good—very good
Suitable aftertreatment	—	1, 6	—
OTHER FIBRES			
Dyeing		Silk: Glauber's salt and acetic or formic acid	—
Staining		Silk and wool dyed lighter than cotton. Acetate slightly stained Nylon dyed	Acetate stained
PRINTING		Cellulose: urea process Silk and wool: suitable	Cellulose: direct Silk and wool: suitable
FASTNESS PROPERTIES			
Method	ISO	AATCC Direct AATCC (6) ISO Direct ISO (1 & 6)	ISO
Acid (organic)	3	2–3 2–3 4 4	4–5
Alkali	4	4 4 5 5	4–5
Hot pressing	2–3	1 5 3 3	4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	5	— — 5 —	5
normal	5–6	4–5 4–5 5–6 5–6	5–6
2 × normal	6	— — 6 —	6
Washing — alteration	2	(I) 2 (I) 2 2–3 3	3–4
staining	—	— — — —	—
Water — alteration	1–2	2 4 2–3 3	3–4
staining	—	— — — —	—
OTHER PROPERTIES			
Dischargeability	Neutral: fairly good Alkaline: poor	Direct and aftertreated: neutral, fair; alkaline, poor	Neutral: fairly good—good Alkaline: fair
Effect of metals — Copper Iron		Practically unaffected Practically unaffected	— —
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section Paper: occasionally used in beater	Paper

113	114	115	C.I. Direct Red
Monoazo 17880	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Red	Yellowish Red	Dull Yellowish Red	HUE: Daylight
Normal — — 80-100 Good —	Normal B Good — — —	Normal — — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed much lighter than cotton, wool lighter Acetate unstained	— Silk slightly stained Wool heavily stained	Silk and wool; Glauber's salt Silk and wool dyed lighter than cotton Acetate slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose: urea process with disodium orthophosphate		PRINTING
ISO 4 5 3 4-5 5 5 2 — —	AATCC ISO 4 4 4-5 2-3 5 4 — 5-6 5-6 6 — 6 (II) 3 3-4 — — 3-4 3-4 — —	ISO 4 4 4 5 5-6 6 3-4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: fairly good Unaffected Unaffected	Very good Unaffected Unaffected	Not dischargeable Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper Heavy metal salts have pig- ment usage	Paper Leather: see Leather Dyes section	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 116—120

C.I. Direct Red	116	117	118
CHEMICAL CLASS	Disazo	Disazo	Monoazo
C.I. CONSTITUTION NUMBER		28230	17780
HUE: Daylight	Dull Yellowish Red (Direct)	Bluish Red (8)	Bright Red (8) Reddish Orange (10)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — 6	Normal A — 60 — 8	Normal A Good 20–60 — 8, 10
OTHER FIBRES Dyeing Staining	— Silk and wool dyed lighter than cotton Acetate stained	— Silk and wool dyed equal to cotton, but yellower Acetate unstained	Silk: acetic acid Silk and wool dyed somewhat heav- ier and yellower than cotton. Ace- tate stained, nylon heavily stained
PRINTING	Cellulose: urea process with disodium orthophos- phate Wool and silk: suitable	Cellulose: discharge	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC ISO 4 4–5 3 4–5 3 1 — 5 5 5–6 — 6 (II) 2–3 4 — — 3–4 4 — —	ISO (8) 4 4 3 2 3 4 3 — 3 —	AATCC ISO ISO (8) (8) (10) 5 4 4 3 4 4 3–4 4 4 — 1 2 2 2 2 — 2 2–3 (II) 3 3–4 3–4 — — — 5 3–4 3–4 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: fair Slightly affected Slightly affected	Very good Somewhat affected Somewhat affected	Cellulose (8), very good; (10) good Silk: neutral, fair–fairly good Somewhat affected Considerably affected
NOTES AND NON-TEXTILE USAGE	Aftertreatment with for- maldehyde improves the fastness to washing and water Leather: see Leather Dyes section Paper and Cellophane		Leather: on chrome suede, de- veloped See also C.I. Direct Red 123 for dyes of similar properties

118:1	119	120	C.I. Direct Red
Monoazo	Monoazo 19590	Disazo 25275	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red (8) Reddish Orange (10)	Bluish Red (8)	Bordeaux (8)	HUE: Daylight
Slightly different chemically from C.I. Direct Red 118 but similar in properties and usage	Normal — — — 8	Normal — Fair 60 Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk: Glauber's salt and acetic acid Silk and wool dyed somewhat lighter than cotton. Acetate slightly stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO (8) 3 5 4 1 1 2 2-3 — 3 —	AATCC (8) 5 5 5 — 1-2 — (II) 3 — 4 —	ISO (8) 4 5 4 1 1 2 4 — 3-4 —
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Poor — —	Good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 121—125

C.I. Direct Red	121	122	122:1
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	28250	29210	
HUE: Daylight	Bluish Red→Bordeaux (8)	Red (8)	Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 60–80 Good 8	Normal — Fair 80 Fair 8	Slightly different chemically from C.I. Direct Red 122, but similar in properties and usage
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk dyed equal to cotton, wool lighter than cotton. Acetate slightly stained, nylon heavily stained	Silk: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate slightly stained, nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 5 5 — 3 — (II) 2–3 3 — ISO (8) 4 4 3 3 4 —	AATCC (8) 5 4 5 — 2 — (II) 4–5 5 — ISO (8) 3–4 5 4 2 2 2 4 4 —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Slightly bluer Unaffected	Fair–fairly good Duller, bluer Unaffected Somewhat sensitive to hard water	
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage	Leather: occasional use on chrome tannage	

123	124	125	C.I. Direct Red
Monoazo 17820	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Red (8)	Red (8)	Bright Red (8)	HUE: Daylight
Normal — Good — Good —	Normal — Good — Good 8	Normal B — 100 — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed heavier than cotton. Acetate and nylon heavily stained	— Silk and wool dyed lighter than cotton. Acetate unstained, nylon heavily stained	— Silk and wool dyed yel- lower than cotton Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 5 4 5 — 3 — 2 — 4 —	AATCC (8) 5 3 3 1 1 2 (II) 5 — 5 —	ISO (8) 4-5 4 3 1 1 2 4-5 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good-very good Bluer, duller Unaffected	Neutral: very good Much weaker Appreciably yellower and weaker	Good Somewhat affected Somewhat affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage Paper: occasional use For dyes of similar properties see C.I. Direct Red 118			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 126—129

C.I. Direct Red	126	127	127:1
CHEMICAL CLASS	Monoazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	17785	28215	28240
HUE: Daylight	Bright Red (8)	Bordeaux (8)	Bluish Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — — — 8	Normal A — 60–80 — 8	Similar in properties and usage to C.I. Direct Red 127. Formerly described as C.I. Direct Red 127A
OTHER FIBRES Dyeing Staining	— Silk dyed lighter and yellower, Wool heavily stained Acetate stained	Silk: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate stained, nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 3–4 3 3 1 2 2 3–4 — 3–4 —	AATCC (8) 5 5 4 — 3 — (II) 2–3 — 3–4 —	ISO (8) 4 4 3 2 3 4 3 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good Unaffected Unaffected	Cellulose: good–very good Silk: neutral, fairly good Practically unaffected Practically unaffected	
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn	Leather: on chrome tannage, particularly chrome suedes for garments Paper: occasionally for beater dyeing and coating Soap colouring	

127:2	128	129	C.I. Direct Red
Disazo 28215 or 28240	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bordeaux→Bluish Red (8)	Yellowish Red (8)	Yellowish Red (8)	HUE: Daylight
Similar in properties and usage to C.I. Direct Red 127 but with the chemical constitution not precisely defined	Normal — Fair — Fair 8	Normal — Good — Fair 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: Suitable Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	— Silk and wool much lighter than cotton. Acetate and nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
	AATCC (8) 4 2 3 — 2 — (II) 4 — 4 —	AATCC (8) 5 2 3 — 2 — (II) 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
	Cellulose: neutral, fairly good Silk: neutral, fair–fairly good Slightly yellower and duller Slightly duller and weaker	Cellulose: neutral, fairly good Silk: neutral, fair–fairly good Unaffected Slightly weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: on chrome suede	Leather: on chrome suede	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 130—135

C.I. Direct Red	130	131	132
CHEMICAL CLASS	Disazo	Monoazo	Disazo
C.I. CONSTITUTION NUMBER	28340		
HUE: Daylight	Bordeaux (8)	Red (8)	Bright Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Fair 8	Normal B — — — 8	Normal — Good — Fair 8
OTHER FIBRES Dyeing Staining	— Silk dyed much lighter than cotton, wool lighter	— Silk and wool dyed heavier than cotton Acetate heavily stained	Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (8) 3 4 3-4 3 4 4 4 — 4-5 —	ISO (8) 5 5 4-5 1 1-2 2 3 — 4-5 —	AATCC (8) 2 1 4-5 — 2-3 — (II) 2-3 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good—very good Somewhat bluer Bluer, trace weaker	Very good — —	Neutral: fair—fairly good Slightly weaker Slightly weaker
NOTES AND NON-TEXTILE USAGE			Leather: occasional use on chrome tannage

133	134	135	C.I. Direct Red
Trisazo	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Bluish Red (8)	Bordeaux (8)	Dull Bluish Bordeaux (8)	HUE: Daylight
Normal — Good — Fair 8	Normal A — — — —	Normal — Good — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: Glauber's salt and acetic acid Silk and wool much lighter than cotton. Acetate slightly stained, nylon heavily stained	— Silk dyed equal to cotton, wool heavier Acetate stained	— Silk and wool dyed equal to cotton. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 3 4 5 — 3 — (II) 3 — 4 —	ISO (8) 4-5 5 3-4 2 3 3-4 4 — 5 —	AATCC (8) 3 3 3 — 5 — (II) 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Unaffected Slightly yellower	Very good — —	Neutral: good Bluer and duller Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 136—141

C.I. Direct Red	136	137	138
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Red (8)	Bluish Red (8)	Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fair — Good 8	Normal — Good — Good 8	Normal — Fairly good — Good 8
OTHER FIBRES Dyeing	—	—	—
Staining	Silk and wool dyed equal to cotton. Acetate unstained, nylon stained	Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon heavily stained	Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon heavily stained
PRINTING			
FASTNESS PROPERTIES Method	AATCC (8)	AATCC (8)	AATCC (8)
Acid (organic)	3	3	3-4
Alkali	5	3	2-3
Hot pressing	3	1	3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	—	—
normal	4	2	1-2
2 × normal	—	—	—
Washing — alteration staining	(II) 4	(I) 3	(II) 4-5
Water — alteration staining	5	4	5
OTHER PROPERTIES Dischargeability	Neutral: good	Neutral: very good	Cellulose: neutral, very good Silk: neutral, fairly good-good
Effect of metals — Copper Iron	Little bluer Little bluer and duller	Bluer Yellower	Weaker and duller Weaker and duller
NOTES AND NON-TEXTILE USAGE			Leather: on chrome suede, developed

139	140	141	C.I. Direct Red	
Trisazo	Disazo	Disazo 25240	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Yellowish Red (8)	Bluish Red (8)	Bright Red (8)	HUE: Daylight	
Normal — Good — Good 8	Normal C — — — 8	Normal C Good 80 — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon dyed	— Silk and wool dyed lighter and yellower than cotton. Acetate stained	Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Acetate stained, nylon heavily stained	OTHER FIBRES Dyeing Staining	
			PRINTING	
AATCC (8) 5 1 1-2 — 3 — (II) 4 — 5 —	ISO (8) 4 5 2 1 2 2 4 — 5 —	AATCC (8) 3 4 5 — 3 — (II) 3 — 4 —	ISO (8) 3 3-4 3-4 3 3 4 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good Slightly duller Much duller	Very good Somewhat affected Somewhat affected	Good Little duller Little duller Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: on chrome suede, developed		Leather: occasional use on chrome tannages	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Red 142—147

C.I. Direct Red	142	143	144
CHEMICAL CLASS	Monoazo		Monoazo
C.I. CONSTITUTION NUMBER	19500		17830
HUE: Daylight	Bright Red (8)	Dull Bordeaux (8)	Bright Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 40 Good 8	Normal C — — — 8	Normal — — 80 Fairly good 8
OTHER FIBRES Dyeing Staining	— Silk and wool dyed equal to cotton Acetate stained		Silk: acetic or formic acid Silk dyed much lighter than cotton, wool lighter Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 3-4 5 3-4 2 3 3 2-3 — 3 —	AATCC (8) 4 3 5 3 4 5 (II) 4 — 4 —	ISO (8) 3 3 3 4 3 3 4 3-4 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fairly good Unaffected Unaffected	Good — —	Good—very good Unaffected Bluer
NOTES AND NON-TEXTILE USAGE		Leather	

145	146	147	C.I. Direct Red
Monoazo 17805		Monoazo 17800	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red (8)	Dull Bordeaux (8)	Bluish Pink (8)	HUE: Daylight
Normal A — — — 8	Normal C — — — 8	Normal — — — — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acetic or formic acid Silk dyed lighter than cotton, wool lighter and yellower Acetate unstained			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 4 3-4 4-5 3 3-4 4 (II) 4 — 4 —	ISO (8) 4-5 3 3-4 3 4 4 4 4-5 —	ISO (8) 4 3-4 3 2 3 4 4-5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good—very good	Good	Fairly good	OTHER PROPERTIES Dischargeability
Slightly bluer Slightly bluer	— —	— —	Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 148—153

C.I. Direct Red	148	149	150	
CHEMICAL CLASS	Disazo	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	25005	29110	28260	
HUE: Daylight	Bordeaux→Dull Reddish Violet (8)	Bordeaux (8)	Bordeaux (8)	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good — — 8	Normal — Good — Good 8	Normal — — 80 Fair 8	
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate stained, nylon heavily stained	— Silk and wool dyed lighter than cotton, reserved cold. Acetate stained, nylon heavily stained	— Silk and wool dyed lighter than cotton Acetate unstained	
PRINTING				
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3—1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 5 5 — 2 — (II) 3 — 4 —	ISO (8) 4 3 4 4 1 1 2 4 — 4-5 —	AATCC (8) 5 4 3 1 2 3 (II) 4 — 5 —	ISO (8) 3 4 3 2 3 3 3-4 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good—very good Alkaline: good Bluer and duller Somewhat affected	Cellulose: neutral, good—very good Silk: neutral, fair—fairly good Bluer Slightly bluer	Good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE	Covers irregular quality viscose yarn Leather: occasional use on chrome tannages	Fastness on silk and wool Light, poor; washing, good Leather: on chrome suede		

151	152	153	C.I. Direct Red
Monoazo	Disazo 28360	Disazo 28210	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red (8)	Red (8)	Red→Bluish Red (8)	HUE: Daylight
Normal A — — — 8	Normal — Good 60 Good 8	Normal A Good 60 — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed equal to cotton but yellower, wool equal Acetate stained	— Silk dyed equal to cotton, wool lighter. Acetate slightly stain- ed, nylon heavily stained	— Silk dyed equal to cotton, wool lighter. Acetate slightly stain- ed, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 5 3 5 — 2 — (II) 4 — 5 —	ISO (8) 4-5 3 3 2 2 2 3 — 4 —	AATCC (8) 4 2 5 3 4 5 (II) 2-3 — 2-3 —	ISO (8) 4 2-3 3 3 3 4 3-4 — 3-4 —
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Good Somewhat affected Affected	Good Bluer, duller Unaffected	Very good Bluer and duller Somewhat weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
—	Leather: occasional use on chrome tannage	Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red	154	155
CHEMICAL CLASS	Disazo	Disazo
C.I. CONSTITUTION NUMBER	28211	25210
HUE: Daylight	Bluish Red (8)	Red (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 60 Good 8	Normal C Good 80 — 7, 8
OTHER FIBRES Dyeing Staining	— Silk dyed equal to cotton, wool lighter Acetate unstained	Silk: Glauber's salt and acetic acid Silk dyed equal to cotton, wool lighter Acetate stained, nylon heavily stained
PRINTING	Cellulose: discharge	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 3 3-4 3 3 3 4 4 — 3-4 —	AATCC AATCC ISO ISO (7) (8) (7) (8) 5 5 4 4 2 5 4 4 4 5 — 4 — — 2 2 3 3 3 3 — — 3 3 (II) 2 (II) 2-3 3-4 4 — — — — 3 3-4 4 4 — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Slightly bluer Slightly bluer	Developed: good—very good Coupled: neutral, fairly good; alkaline, fair Unaffected Somewhat weaker Sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Leather: occasional use on chrome tannage

156	157	158	C.I. Direct Red
Disazo 25215			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Red (8) Reddish Orange (7 and 10)	Bright Yellowish Red→ Yellowish Red (8)	Bluish Red (8)	HUE: Daylight
Normal — Good 60 Fair 7, 8, 10	Normal — — — Good 8	Normal — — — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C. Levelling Suitable aftertreatment
Silk: Glauber's salt and acetic acid Silk dyed equal to cotton, wool lighter Acetate slightly stained, nylon heavily stained			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (7) 3 1-2 3 — 3 — (II) 2-3 4 —	AATCC (8) 5 4 4 — 3-4 — (II) 3-4 4 —	ISO (8) 3 4 4 — 2-3 — 2-3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Alkaline: fairly good—good Trace duller Unaffected Somewhat sensitive to hard water	Good—very good — —	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 159—164

C.I. Direct Red	159	160	161
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Red (8)	Bluish Red (8)	Bordeaux (8)
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	—	—
Levelling	Good	Good	Good
Suitable aftertreatment	8	8	8
OTHER FIBRES			
Dyeing			
Staining			
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	ISO	ISO
Acid (organic)	(8) 4	(8) 4	(8) 4
Alkali	5	4	5
Hot pressing	—	—	—
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	—	—
normal	2	3	2
2 × normal	—	—	—
Washing — alteration	3	2-3	3
staining	—	—	—
Water — alteration	4	3	3-4
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Very good	Very good	Very good
Effect of metals — Copper			
Iron			
NOTES AND NON-TEXTILE USAGE			

162	163	164	C.I. Direct Red
			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bordeaux→Dull Reddish Violet (8)	Bright Yellowish Red (8)	Bright Yellowish Red (8)	HUE: Daylight
Normal — — Good 8	Normal — — Good 8	Normal — — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
ISO (8) 4 4 — — 3 — 3 — 3 —	ISO (8) 4-5 2 3 — 2-3 — 2 — 3 —	ISO (8) 4-5 2 3 — 2-3 — 2 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Good	Good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 165—170

C.I. Direct Red	165	166	167
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Bordeaux→Brownish Violet (8)	Bordeaux→Dull Violet (8)	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 8	Normal — — — Good 8	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Red 157
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (8) 4 5 3-4 — 2 — 3 — 3-4 —	ISO (8) 2-3 4 2-3 — 2-3 — 3-4 — 3-4 —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good	Good	
NOTES AND NON-TEXTILE USAGE			

168	169	170	C.I. Direct Red
Monoazo 19575	Disazo 25000		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red (8)	Dull Red (7)	Bright Red (7)	HUE: Daylight
Normal — — — — 8	Normal — — 60 Good 7	Normal C — — — 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate stained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO (8) 3-4 5 4 — 2 — 3 — 3-4 —	ISO (7) 4-5 4-5 5 1 1 2 4 — 4 —	ISO (7) 4 2 4 2 3 4 4-5 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor	Neutral: good Alkaline: fairly good-good	Neutral: good-very good Alkaline: fairly good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 171—176

C.I. Direct Red	171	172	173
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER			29290
HUE: Daylight	Dull Red (3)	Dull Bluish Red (3)	Dull Bordeaux (Direct) Dull Red (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — 3	Normal C — — — 3	Normal — — 100 Poor 3
OTHER FIBRES Dyeing Staining	 Silk and wool heavily stained. Acetate stained	 Silk and wool dyed somewhat lighter than cotton Acetate unstained	 Silk and wool dyed slightly lighter than cotton Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC (3) 2 3-4 5 — 4-5 — (III) 3-4 — 5 —	ISO (3) 2 3-4 4 5-6 6 6 4 — 4 —	AATCC (3) 5 4 5 — 6-7 — (III) 4-5 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: good-very good — —	Fairly good — —	Neutral: fair Alkaline, with anthraquin- one: fair Unaffected Somewhat bluer and weaker
NOTES AND NON-TEXTILE USAGE			

174	175	176	C.I. Direct Red
Disazo 28686	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Red (3)	Bluish Red→Reddish Violet (3)	Bluish Red→Reddish Violet (3)	HUE: Daylight
Normal C — — 3	Normal C — — 3	Normal B — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk dyed lighter than cotton Wool slightly stained Acetate stained	Silk dyed lighter than cotton Acetate stained	Wool dyed lighter than cotton Silk heavily stained Acetate stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent, followed by steaming and aftertreatment 3	Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent, followed by steaming and aftertreatment 3	Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent, followed by steaming and aftertreatment 3	PRINTING
AATCC (3) 1 4-5 5 — 3-4 — (III) 3 5 —	AATCC (3) 1 3 5 — 5-6 — (III) 4-5 5 —	AATCC (3) 2 4 5 — 5-6 — (III) 4 5 —	FASTNESS PROPERTIES Method • Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: very good	Neutral: fairly good Alkaline: fair	Neutral: fair Alkaline: fairly good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Unsuitable for cotton-wool unions		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 177—182

C.I. Direct Red	177	178	179
CHEMICAL CLASS	Disazo		Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Red (3)	Dull Red (3)	Bluish Red→Reddish Violet (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — 3	Normal C Fair — — 3	Normal C — — — 3
OTHER FIBRES Dyeing Staining	 Silk and wool dyed lighter than cotton Acetate stained	 Silk dyed lighter than cotton Wool heavier and duller than cotton. Nylon dyed	 Silk dyed slightly lighter than cotton Wool heavily stained
PRINTING	Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent followed by steaming and aftertreatment 3	Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent, followed by steaming and aftertreatment 3	Cellulose: urea process with NaOH, disodium orthophosphate and solubilising agent, followed by steaming and aftertreatment 3
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (3) 1 4 5 — 4-5 — (III) 3 — 5 — —	ISO (3) 1 4 4 5-6 6 6-7 4 — 4-5 — —	AATCC (3) 4 4 5 — 5-6 — (III) 4 — 5 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Alkaline: very good — —	Fairly good Unaffected Yellower, duller, weaker	Fair — —
NOTES AND NON-TEXTILE USAGE			

180	181	182	C.I. Direct Red
Disazo 24565	Disazo 26545	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Red (3)	Dull Yellowish Red (3)	Dull Red (3)	HUE: Daylight
Normal — — 60–80 — 3	Normal C — — — 3	Normal C — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk and wool heavily stained Acetate unstained	Silk dyed lighter than cotton Wool heavily stained Acetate stained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with NaOH, disodium orthophosphate and a solubilising agent, followed by steaming and aftertreatment 3	Cellulose: urea process with NaOH, disodium orthophosphate and a solubilising agent, followed by steaming and aftertreatment 3	PRINTING
ISO (3) 3 4 4 5–6 6 6 4 — 4–5 —	AATCC (3) 2 3 5 — 5–6 — (III) 4 — 5 —	ISO (3) 3 4 4 5 6 6–7 4 — 4–5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Alkaline with anthra- quinone: fair Somewhat weaker Unaffected	Neutral: fairly good Alkaline: fair — —	Fair — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 183—188

C.I. Direct Red	183	184	185
CHEMICAL CLASS			Disazo
C.I. CONSTITUTION NUMBER			21610
HUE: Daylight	Bluish Red→Reddish Violet (3)	Bluish Red (3) and (4)	Dull Red→Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — 80 — 3	Normal C — 80-90 — 3, 4	Chrome Soga (see C.I. Direct Yellow 72) — — — — Chromium fluoride
OTHER FIBRES Dyeing Staining	 Acetate unstained	 Wool dyed lighter than cotton Acetate unstained; nylon slightly stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (3) 5 3-4 4 5-6 6 6 4-5 — 4-5 —	ISO (3) 5 4 4-5 5-6 6 6-7 4 — 4-5 —	ISO (4) 4 3-4 5 5-6 6 6-7 4-5 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Not dischargeable Somewhat sensitive to hard water	Aftertreated (3) & (4): good Somewhat affected Slightly affected	
NOTES AND NON-TEXTILE USAGE			For Batik, wax resist, process

186	187	188	C.I. Direct Red
Disazo 26540	Stilbene 40275	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Bordeaux	Yellowish Red*	Bordeaux (6)	HUE: Daylight
Chrome Soga (see C.I. Direct Yellow 72) — — — — Chromium fluoride	Normal — — — Very good *1 or chromium fluoride	Normal — Good — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO (1) 3 2 2-3 4-5 5-6 6 3 — 3 — ISO (Chromium fluoride) 3 2 2-3 4-5 5-6 6 4 — 4 —	AATCC (6) 5 5 3 — 1 — (II) 3 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: fairly good Alkaline: fair — —	Neutral: fairly good Bluer Bluer, duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
For Batik, wax resist, process			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 189—194

C.I. Direct Red	189	190	191
CHEMICAL CLASS	Disazo		Monoazo
C.I. CONSTITUTION NUMBER	28400		17900
HUE: Daylight	Bordeaux	Red (6)	Yellowish Red (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fairly good — Good 6	Normal — — — — 6	Normal — — — Good 6
OTHER FIBRES Dyeing Staining	Silk and wool: Glauber's salt and acetic acid Wool dyed, silk heavily stained Acetate unstained, nylon heavily stained		Silk and wool: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate unstained, nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC (Direct) 3 5 5 — 5 — (I) 2 3 —	AATCC (6) 3 3 3—4 2 3 4 (II) 4 4 —	AATCC (Direct) 5 5 4 — 5 — (II) 2 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Bluer Duller		Neutral: good Slightly redder Slightly redder, duller
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannages		Leather: occasional use on chrome tannage

192	193	194	C.I. Direct Red
	Monoazo	Polyazo 35785	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red (6)	Bright Red (8) Artificial light: yellower		HUE: Daylight
Normal — — — 6	Normal A Very good — — 8		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: weakly acid bath Silk dyed equal to cotton Wool heavily stained Acetate slightly stained		OTHER FIBRES Dyeing Staining
	Cellulose: discharge		PRINTING
AATCC (6) 5 4-5 3-4 1 2 3 (II) 3-4 — 3-4 —	ISO (8) 4-5 4 2 2 2 2 4-5 3-4 4-5 2		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Acid, neutral or alkaline: white Trace duller Trace weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Fastness on unweighted silk (ISO): Light 2, 3, 3-4; Perspiration 5, 3-4, C 3-4; Washing 4-5, 3-4, C 2		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red	195	196	197
CHEMICAL CLASS	Azo (metallised, stilbene)	Polyazo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Yellowish Red Artificial light: yellower	Bright Yellowish Red	Bluish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 80–100 Good —		
OTHER FIBRES Dyeing Staining	 Silk and wool heavily stained Acetate, acrylics and polyesters unstained. Nylon slightly stained		
PRINTING	Cellulose: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 — 5 4 4 5 (II) 5 — 4 —		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: poor Unaffected Slightly duller		
NOTES AND NON-TEXTILE USAGE	Leather usage	Leather: see Leather Dyes section	

198	199/200	201	202/203	C.I. Direct Red
Azo				CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Red Artificial light: redder				HUE: Daylight
Normal — — — —	These C.I. Generic Names are discontinued	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Red 37	These C.I. Generic Names are discontinued	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
				OTHER FIBRES Dyeing Staining
				PRINTING
ISO (on viscose) — — 4-5 — 6 — 4 3 4 2-3				FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{4}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
				OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Used on viscose				NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 204—209

C.I. Direct Red	204	205	206
CHEMICAL CLASS	Disazo	Azo	Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Red Artificial light: yellower and brighter	Yellowish Red Artificial light: yellower	Bright Yellowish Red Artificial light: brighter
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Very good 70–90 Fair 3	Normal C Very good 80–100 Poor 8	Normal, small quantity of salt C Very good 90–95 Poor 5
OTHER FIBRES Dyeing Staining	 Acetate slightly stained Nylon heavily stained	 Acetate stained	Silk: Glauber's salt and acetic acid Acetate slightly stained, wool and nylon stained
PRINTING	Cellulose: direct and discharge	Cellulose: direct and discharge	Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (3) 3–4 2–3 5 5–6 6 6–7 (60°C) 4 3 5 4–5	ISO (8) 5 3 3, 5 3 3–4 4 (60°C) 4–5 4 5 5	ISO ISO 3–4 — 3 — 5 — 3 — 4 — 4–5 — 5 — (40°C) 4 4 3 4 4–5 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good, with anthraquinone Considerably affected	Very good Sensitive to hard water	Very good —
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage with aftertreatment 3		Leather: on chrome tannage

207	208	209	C.I. Direct Red
Azo	Azo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red Artificial light: yellower	Bordeaux	Bright Yellowish Red (8) Artificial light: yellower and brighter	HUE: Daylight
Normal C Very good 80-100 Good 4		Normal A Good 95 Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate unstained		Acetate and nylon slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: direct			PRINTING
<div> <div>ISO Direct</div> <div>5</div> <div>3</div> <div>4, 4-5</div> <div>6-7</div> <div>7</div> <div>7</div> <div>(40°C) 3-4</div> <div>1-2</div> <div>4</div> <div>1</div> </div> <div> <div>ISO (4)</div> <div>5</div> <div>3</div> <div>3-4, 4</div> <div>6</div> <div>6-7</div> <div>6-7</div> <div>5</div> <div>4-5</div> <div>5</div> <div>5</div> </div>		<div>AATCC</div> <div>5</div> <div>2</div> <div>4 (yellower)</div> <div>—</div> <div>2</div> <div>—</div> <div>(II) 4-5</div> <div>—</div> <div>4</div> <div>—</div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Not dischargeable			OTHER PROPERTIES Dischargeability
Unaffected Unaffected			Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 210—215

C.I. Direct Red	210	211	212
CHEMICAL CLASS		Disazo	Trisazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	—	Dull Bluish Red	Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is discontinued	Normal B Very good 80 Fair 5	Normal B Fair 100 Fair 5
OTHER FIBRES Dyeing Staining		Acetate unstained	Acetate unstained
PRINTING			Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		ISO Direct 5 4 3-4, 4-5 5-6 6 6-7 (40°C) 3 3 4 2	ISO (5) — — 3 2, 4, 3 5 5-6 6 (40°C) 3 3 4 2
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Poor Unaffected Weaker	Neutral: good Alkaline: fair Slightly weaker Slightly weaker
NOTES AND NON-TEXTILE USAGE		Resin finishing reduces the light fastness slightly	

213	214	215	C.I. Direct Red	
Disazo	Disazo	Monoazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Bordeaux	Red	Red	HUE: Daylight	
Normal C Very good 60 Poor 3	Normal A Poor 80 Good 3	Normal C Very good 80 Fair 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Silk, wool and acetate slightly stained	Acetate slightly stained	Acetate slightly stained	OTHER FIBRES Dyeing Staining	
			PRINTING	
ISO (3) 5 4-5 4, 5, 5 6 6-7 6-7 (40°C) 4-5 4-5 5 5	ISO (3) 5 4-5 3-4, 5, 5 5-6 6 6 4-5 4-5 5 5	ISO Direct 5 4 2-3, 5, 3-4 3 4 4 (40°C) 3 2 4 2	ISO (5) — — — — 3-4 — 4-5 2-3 4-5 4	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: poor Alkaline: fair Unaffected Unaffected Sensitive to hard water	Neutral: poor Alkaline: very good Slightly weaker Trace duller	Good Unaffected Unaffected Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
		Suitable for goods to be given an anti-crease finish	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Red 216—221

C.I. Direct Red	216	217	218
CHEMICAL CLASS	Monoazo	Disazo	Polyazo
C.I. CONSTITUTION NUMBER	17815		
HUE: Daylight	Bright Yellowish Red	Bluish Red	Dull Yellowish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 60–70 Good 8	Normal — — — — 3	Normal B Good 80 Fair 5
OTHER FIBRES Dyeing Staining	Silk, wool and nylon: Glauber's salt and acetic acid Silk, wool and nylon heavily stained, acetate slightly stained Polyester unstained		Acetate slightly stained
PRINTING			Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 5 4 3 2 2 3 3–4 — 4 —		ISO Direct (5) 4–5 2 2, 5, 2–3 6 6–7 7 (40°C) 3 3 3–4 2–3 4–5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Alkaline: poor — Slightly duller Sensitive to hard water	Good	Good Unaffected Almost unaffected
NOTES AND NON-TEXTILE USAGE			

219	220	221	C.I. Direct Red
		Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Bluish Red Artificial light: yellower	Bright Red Artificial light: yellower	HUE: Daylight
This C.I. Generic Name is discontinued	Normal B Very good 80-100 Fairly good —	Normal B Very good 90-95 Good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate unstained	Acetate slightly stained Nylon stained	OTHER FIBRES Dyeing Staining
		Cellulose: direct and discharge	PRINTING
	<div> <div>ISO (Cotton)</div> <div>4-5</div> <div>2-3</div> <div>4-5, 5</div> <div>6</div> <div>7</div> <div>7</div> <div>(40°C) 2-3</div> <div>2-3</div> <div>3-4</div> <div>2-3</div> </div> <div> <div>ISO (Viscose)</div> <div>—</div> <div>—</div> <div>—</div> <div>7</div> <div>7-8</div> <div>8</div> <div>4-5</div> <div>3-4</div> <div>—</div> <div>—</div> </div>	<div>ISO (3)</div> <div>4-5</div> <div>3-4</div> <div>5</div> <div>5</div> <div>6</div> <div>6-7</div> <div>4</div> <div>5</div> <div>4-5</div> <div>5</div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		Alkaline, with anthraquinone: good — Considerably changed	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	U/F antcrease finish gives somewhat bluer hue Leather	Leather: on chrome tannage, with aftertreatment 3 Suitable for goods to be given an antcrease finish	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 222—227

C.I. Direct Red	222	223	224
CHEMICAL CLASS	Disazo		Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Yellowish Red	Bluish Red Artificial light: yellower	Bright Yellowish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Neutral or weakly alkaline, 5–30% salt — — 40 — 3 + acetic acid	Normal B — 80 — —	Normal B Good 90 Fair 5
OTHER FIBRES Dyeing Staining	—	Nylon heavily stained	Acetate slightly stained Polyester unstained
PRINTING	Cellulose: discharge	Cellulose: illuminated discharge	Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) 4–5 4 5 6 6 6–7 (60°C) 5 5 5 5	ISO 4–5 3–4 1–2, 5, 2–3 3–4 4 4–5 (60°C) 4 2 4–5 2	ISO Direct (5) 3–4 5 4–5 4–5 3–4 — 3 — (40°C) 4–5 4–5 5 4 3–4 4–5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good–very good Alkaline, with anthraquinone: good–very good Somewhat affected Unchanged Slightly sensitive to hard water	Good 4–5 4	Good — —
NOTES AND NON-TEXTILE USAGE		Covers irregular-dyeing viscose Leather: see Leather Dyes section	Paper

225	226	227	C.I. Direct Red
Disazo	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Red	Bright Red	Bright Bluish Red	HUE: Daylight
Normal B Good 70 Good 5	Normal B Good 70 Good 5	Normal B Good 90 Good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate slightly stained Polyester unstained	Acetate slightly stained Polyester unstained	Acetate slightly stained Polyester unstained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose: direct	Cellulose: direct	PRINTING
ISO Direct 4-5 5 4-5 3-4 3-4 4 (40°C) 3-4 5 4 2-3 ISO (5) 4-5 5 4-5 — 1 — 4-5 4-5 4-5 4-5	ISO Direct 3-4 5 4-5 3-4 3-4 4 (40°C) 4-5 4-5 4-5 2-3 ISO (5) 4 5 4-5 4-5	ISO Direct 5 2-3 4-5 3-4 4 4-5 4-5 4 4 2-3 ISO (5) 5 2-3 4-5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Fair	Fair	Fair	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Paper	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 228—233

C.I. Direct Red	228	229	230
CHEMICAL CLASS	Disazo	Azo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Red	Bordeaux	Yellowish Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 90 Good 4		Normal B Good 90 Good —
OTHER FIBRES Dyeing Staining	 Acetate slightly stained		 Silk, wool and nylon heavily stained. Acetate, polyester and acrylics unstained
PRINTING	Cellulose: direct		Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 1–2 2 4–5 2 3 3–4 (40°C) 2–3 3–4 1 3 ISO (4) 5 2 4–5 4–5 5 4–5 5		ISO — — — 4 4 4–5 3 — 4–5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fair — — Slightly sensitive to hard water		Neutral: good — —
NOTES AND NON-TEXTILE USAGE	Paper		Paper

231	232	233	C.I. Direct Red
Azo	Disazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Red	Bordeaux Artificial light: yellower	Bright Bluish Red	HUE: Daylight
Normal B Very good 70 Good —	Normal, max. 10 g/l salt C — — 4	Normal B Very good 95 Good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk, wool and nylon heavily stained. Acetate, acrylic and polyester unstained		Wool stained, acetate slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: direct and discharge			PRINTING
ISO — — — 1 2 2 3 — 4 —	ISO (4) — — 4, 5 6 6-7 7 (60°C) 4 3 5 4	ISO (3) 4-5 3-4 4, 5 6 6-7 7 (60°C) 4 3-4 4-5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good — —	5 2 Sensitive to hard water	Little change Noticeable change Slightly sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Covers irregular-dyeing viscose		NOTES AND NON-TEXTILE USAGE

C.I. Direct Red 234—238

C.I. Direct Red	234	235	236
CHEMICAL CLASS	Azo	Azo (metal complex)	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bordeaux Artificial light: yellower	Yellowish Red Artificial light: yellower	Red
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Very good 85 Good 5	Normal, with 5–15 g/l Na ₂ SO ₄ — — 100 — 8 (alkaline)	
OTHER FIBRES Dyeing Staining	Nylon: suitable Wool and acetate slightly stained, silk and nylon heavily stained	 Acetate well reserved	
PRINTING	Cellulose: direct	Cellulose: direct and discharge	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 4–5 3 4–5, 5 5–6 6 6–7 (40°C) 3 2 4 1–2	ISO (8) 5 2–3 3, 4 2–3 3 4 (60°C) 5 3 5 4–5	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: moderate–poor Alkaline: poor Slightly brighter Brighter	4 4–5 5	
NOTES AND NON-TEXTILE USAGE	Aftertreatment 5 improves fastness to wet processing but slightly reduces the fastness to light	Soap dyeings to give best fastness Covers irregular-dyeing viscose	Paper: light, good; water, good; graniting, slight; chlorine, fair Beater dyeing and paper coating

237	238		C.I. Direct Red
Disazo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Red	Bluish Red		HUE: Daylight
Normal, neutral or slightly alk. B — 100 Good 5			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool stained Acetate slightly stained Nylon unstained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO Direct — 3 4 4 5 — (40°C) 3 2-3 4 3	ISO (5) — — 4 3-4 4-5 — 3 2-3 4-5 4		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: 5 Alkaline: 3 1 —			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper: beater dyeing and surface coating Fastness properties: light, good; water, good		NOTES AND NON-TEXTILE USAGE

NOTES

C.I. Direct Violet	1	2	3
CHEMICAL CLASS	Disazo		Disazo
C.I. CONSTITUTION NUMBER	22570		22445
HUE: Daylight	Violet	Dull Violet	Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Very good 100 — —	Normal — — — Very good —	Normal B — 40 — —
OTHER FIBRES Dyeing Staining	Nylon: acetic acid or padded with addition of solubilising agents and ammonium tart-rate as fixing agent Silk and wool dyed lighter and redder than cotton. Acetate stained, Nylon heavily stained	 Silk dyed lighter, wool redder than cotton. Acetate stained. Nylon dyed	 Silk: sl. reddish violet stain, wool: lighter, redder; viscose: heavier, redder. Acetate: slightly stained
PRINTING	Nylon: with solubilising agents and ammonium tart-rate	Cellulose: urea process with disodium phosphate Wool: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4 4 3–4 2 2–3 3 3–4 — 2–3 —	ISO 3–4 4 3–4 2–3 3 3–4 — 2–3 —	ISO 4 3–4 2 1 1 2 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good Little duller Unaffected	Neutral: good—very good; alkaline: fairly good Somewhat affected Unaffected	Neutral: good; alkaline: fairly good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	See Leather Dyes section Paper: beater dyeing Biological stain	Leather Paper	Paper Vegetable-ivory buttons

C.I. Direct Violet 4—9

C.I. Direct Violet	4	5	6
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22555	27660	25385
HUE: Daylight	Dull Reddish Violet	Dull Violet	Bright Reddish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	 — Good —	 — Good —	Normal — — 60–80 Fairly good —
OTHER FIBRES Dyeing Staining			Silk Wool lighter and silk much lighter than cotton Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 1 5 2–3 2 3 3–4 1–2 — 2 —	ISO 3 5 2–3 2 3 3 1–2 — 1–2 —	ISO 3 4 3 3 4 4–5 1–2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: poor, alkaline: fair	Neutral and alkaline: good–very good	Neutral and alkaline: good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE			Paper

7	8	9	C.I. Direct Violet
Disazo 27855	Monoazo 17500	Disazo 27885	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Violet	Bright Violet (Direct) Bluish Violet (3)	Bluish Violet (Direct)	HUE: Daylight
Normal A Fairly good 40-60 — —	Normal — Very good 60 Fairly good-good 3	Normal A Good 40 — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool: Glauber's salt and ammonium acetate Silk: neutral Nylon Silk dyed as cotton but much redder, wool as cotton but redder and duller, acetate slightly stained, nylon dyed	Silk Wool dyed lighter than cotton Acetate stained	Wool and silk Silk and wool dyed lighter than cotton. Acetate slightly and nylon heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate		Cellulose and silk: direct	PRINTING
AATCC ISO 4 4 4 4 1 1-2 — 3 4 3-4 — 4 1 1-2 — — 1 1 — —	ISO ISO (Direct) (3) 4 4 4-5 4-5 2 3 1 3-4 1 4 1-2 5 2 2 — — 2 2-3 — —	AATCC ISO ISO (Direct) (Direct) (3) 5 3 3 4-5 4-5 4-5 3 1 3-4 — 1 — 2 2 5-6 — 2 — 2 1-2 2 — — — 1-2 1-2 2 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good Unaffected Little duller	Direct: neutral and alkaline, good. Aftertreated: neutral and alkaline, fairly good Unaffected Unaffected Somewhat sensitive to hard water	Direct and aftertreated: neutral and alkaline, good Bluer Redder, duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
See Leather Dyes section Heavy metal salts as pigments in nitrocellulose lacquers Paper: beater dyeing, good light fastness Regenerated-cellulose film Casein-formaldehyde plastics Reactions on cellulose H ₂ SO ₄ 10%—bluish violet NaOH 10%—unchanged		Leather: on chrome tannage Paper: beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 9:1—13:1

C.I. Direct Violet	9:1	10	11
CHEMICAL CLASS		Monoazo	Disazo
C.I. CONSTITUTION NUMBER		18100	27910
HUE: Daylight	—	Bluish Violet	Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Somewhat different chemically from C.I. Direct Violet 9, but very similar in properties and usage	80 Very good —	
OTHER FIBRES Dyeing Staining		Silk lighter than and wool same as cotton Acetate unstained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		ISO 3 4–5 2–3 1 2 2 1 — 1–2 —	ISO 2 4–5 1–2 3 4 4 1–2 — 1–2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: fairly good–good, alkaline: good Unaffected Unaffected Somewhat sensitive to hard water	Neutral: fairly good–good, alkaline: good
NOTES AND NON-TEXTILE USAGE			

12	13	13:1	C.I. Direct Violet
Disazo 22550	Disazo 24080		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Violet (Direct) Reddish Navy (8)	Bluish Violet		HUE: Daylight
Normal C Good 80-100 — 6, 8	Normal C — Very good affinity cold — —	Slightly different chemically from C.I. Direct Violet 13, but similar in properties and uses	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk Silk and wool somewhat lighter and redder than cotton Acetate stained, nylon dyed	Silk Silk, wool and nylon dyed deeper and redder than cotton. Acetate unstained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC Direct 2 5 1 — 2 — 1-2 — 2 —	ISO Direct 3-4 4-5 2 1 1-2 2 2 — 1-2 —	ISO (8) 4 4-5 3 2 3 3-4 3 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct and developed: neutral, fair; alkaline, fairly good Unaffected Unaffected Somewhat sensitive to hard water	Neutral and alkaline: very good Somewhat affected Markedly affected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper Reactions on cellulose H ₂ SO ₄ 10%—darker NaOH 10%—redder	Leather Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 14—19

C.I. Direct Violet	14	15	16
CHEMICAL CLASS	Disazo	Azo	Disazo
C.I. CONSTITUTION NUMBER	29105		27760
HUE: Daylight	Bright Reddish Violet	Bright Reddish Violet	Reddish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 80 Fairly good —	Normal — — Good affinity at low temp. Good—very good —	
OTHER FIBRES Dyeing Staining	Acetate slightly stained, nylon dyed Silk dyed lighter than cotton, wool dyed to same depth as cotton	Acetate unstained Silk lighter than cotton, wool slightly stained at 40°C but dyed to same depth as cotton at 80–100°C	
PRINTING	Cellulose: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC ISO 3 3 4 3 2 2 — 1–2 2 2 — 2 2 2–3 — — 3 2–3 — —	ISO 2–3 5 4–5 3 4 4 2–3 — 2–3 —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: fairly good Slightly bluer Yellower and weaker Somewhat sensitive to hard water	Neutral and alkaline: very good Much bluer Weaker and duller	Neutral: very good, alkaline: good
NOTES AND NON-TEXTILE USAGE	Paper	Reactions on cellulose H ₂ SO ₄ conc.—dark blue Leather: see Leather Dyes section	Paper

17	18	19	C.I. Direct Violet
Disazo 22465	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Bluish Violet	Violet	Bright Reddish Violet	HUE: Daylight
Normal — — — — —	Normal A — Good affinity cold — —	Normal A — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk —	 Acetate unstained Silk and wool redder than cotton, nylon not as heavily dyed as cotton		OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 4-5 3 1 2 2 2 — 2 —	ISO 4-5 3-4 2-3 1 1 2 2-3 — 3 —	AATCC 4-5 3-4 3 3 3-4 4 2-3 — 2 —	ISO 4-5 3 2 3 4 4 4 — 2 —
Neutral and alkaline: fair-fairly good	Neutral and alkaline: very good Slightly affected Considerably affected	Neutral and alkaline: fairly good	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Leather Paper		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 20—25

C.I. Direct Violet	20	21	22
CHEMICAL CLASS		Disazo	Disazo
C.I. CONSTITUTION NUMBER		23520	22480
HUE: Daylight	Bright Reddish Violet	Dull Reddish Violet	Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good —	Normal — — 80 Poor —	Normal A Fair — — —
OTHER FIBRES Dyeing Staining		Wool Silk Wool dyed lighter than cotton Acetate stained	Nylon: acetic or formic acid Acetate stained Nylon dyed Silk redder than cotton, wool redder and heavier
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 4 2-3 — 1 — 2 — 1-2 —	ISO 1 3 2-3 1 2 2 1-2 — 1-2 —	AATCC 4-5 4 3-4 1 1-2 2 2 — 1-2 — ISO 4-5 4 2-3 1 1 2 2-3 — 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good	Neutral: fairly good; alkaline: good Somewhat browner Unaffected Somewhat sensitive to hard water	Neutral and alkaline: very good Unaffected Much duller
NOTES AND NON-TEXTILE USAGE			See Leather Dyes section

23	24	25	C.I. Direct Violet
	Azo	Disazo 22930	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Violet	Dull Bluish Violet	Dull Bluish Violet	HUE: Daylight
Normal A — — — —	Normal A — — Dyes irregular-dyeing viscose level —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate unstained Nylon dyed Silk and wool dyed to same depth as cotton		Silk	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2-3 4-5 4-5 3 3 4 2-3 — 2-3 —	ISO (Viscose) 2* 2 1 3 4 4-5 3 — 3 —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Neutral and alkaline: very good Unaffected Trace duller	Neutral: fair; alkaline: moderate—fairly good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	*Mineral acid Reactions in substance H ₂ SO ₄ conc.—dull green		NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 26—31

C.I. Direct Violet	26	27	28
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	27860	22460	23685
HUE: Daylight	Bright Violet	Violet (Direct) Dull Reddish Blue→Navy (8)	Dull Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 60–80 Good–very good —	Normal — — 80 Fairly good 8	Normal — — — — —
OTHER FIBRES Dyeing Staining	 Acetate stained Silk and wool dyed lighter than cotton	 Acetate stained Silk and wool dyed lighter than cotton	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 4 2–3 1 2 2 1–2 — 1–2 —	ISO (Direct) 3–4 4–5 2 1–2 2–3 3 1–2 — 1–2 —	ISO (8) 3 5 3 2 3 3 3 — 3–4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good–good; alkaline: good Unaffected Unaffected	Neutral: fair; alkaline: fairly good Unaffected Much duller	
NOTES AND NON-TEXTILE USAGE	Paper	Paper Soap	

29	30	31	C.I. Direct Violet	
Disazo —	Disazo —	Disazo 27880	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Bright Bluish Violet	Bright Violet	Bluish Violet (Direct) Dull Violet (3)	HUE: Daylight	
Normal — Good — Good —	Normal — Good — Good —	Normal — — 60 Good—very good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Acetate slightly stained Nylon stained Wool and silk dyed lighter than cotton	Silk and wool dyed much lighter than cotton. Acetate unstained. Nylon heavily stained	Acetate stained	OTHER FIBRES Dyeing Staining	
		Cellulose: direct	PRINTING	
AATCC 3 3 2 — 4 — 2 — 1 —	AATCC 3 3 2 — 4 — 2 — 1 —	ISO (Direct) 5 4 3-4 1-2 2 2 2 — 2 —	ISO (3) 4-5 4-5 4 4-5 4-5 5 2-3 — 2-3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Duller Slightly duller	Neutral: good Little duller Unaffected	Direct, neutral and alkaline: good—very good After-coppered, neutral, fairly good—good, alkaline, poor—fair	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: on chrome tannage Paper: clear backwater Reactions in substance H ₂ SO ₄ conc.—dull blue; on diln—dull bluish violet and ppt NaOH 10%—weak dull violet	Leather: on chrome tannage Paper: clear backwater Reactions in substance H ₂ SO ₄ conc.—greenish blue; on diln—dull bluish violet and ppt NaOH 10%—weak dull reddish violet	Paper	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Violet 32—37

C.I. Direct Violet	32	33	34
CHEMICAL CLASS	Disazo		Disazo
C.I. CONSTITUTION NUMBER	24105		
HUE: Daylight	Bluish Violet	Bright Violet	Bright Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 3	Normal — Good — Good —	Normal — Good — Good —
OTHER FIBRES Dyeing Staining		Acetate heavily stained Nylon stained Silk and wool dyed much lighter than cotton	Silk, wool and nylon, heavily stained Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 2 1-2 1 1 1-2 2 1-2 — 1-2 —	AATCC 3-4 4-5 3 — 1 — 1-2 — 3 —	AATCC 2 2 5 — 4-5 — 4-5 — 1 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and after-coppered, neutral and alkaline: good	Neutral: good—very good Redder —	Neutral: very good Much weaker Much redder and duller
NOTES AND NON-TEXTILE USAGE	Fastness to light and washing improved by treatment with copper sulphate Indicator	Reactions in substance H ₂ SO ₄ conc.—blue, on diln —reddish violet	Reactions in substance H ₂ SO ₄ conc.—green, on diln—violet and ppt Reactions on cellulose H ₂ SO ₄ 10%—trace bluer NaOH 10%—redder and duller

35	36	37	C.I. Direct Violet
Disazo 27915	Disazo 22470	Disazo 24370	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Violet	Bright Violet	Bluish Violet	HUE: Daylight
Normal — — 60 Good 3	Normal — — — — —	Normal — — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk Silk dyed much lighter and wool dyed lighter than cotton Acetate stained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 4 3 1 2 3 2 — 1-2 —	ISO 4 3 2 1 1 1 1 — —	ISO (Direct) ISO (3) 5 5 4 4 — — — — — — — — 2-3 3-4 — — 2-3 4 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good—good; alkaline: good Unaffected Unaffected	Neutral and alkaline: fair	Direct, neutral: good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper			NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 38—43

C.I. Direct Violet	38	39	40
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22630	23680	27900
HUE: Daylight	Violet	Reddish Violet (Direct) becoming greener on aftertreatment 3	Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — — —	Normal — — — Good 3	Normal — — — Very good —
OTHER FIBRES Dyeing Staining			Acetate slightly stained Silk and wool dyed much lighter than cotton
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 4–5 2 — 3 — 2 — 2 —	ISO (Direct) ISO (3) 3–4 3–4 1–2 2 2 2 1 — 1–2 2–3 2 — 1–2 1–2 — — 1–2 2 — —	ISO 4–5 4 — — 4 — 1–2 — 1–2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: poor–fair; alkaline: fairly good–good	Direct and 3, neutral and alkaline: good	Good
NOTES AND NON-TEXTILE USAGE		Biological stain	

41	42	43	C.I. Direct Violet
Disazo 27850	Disazo 22450	Disazo 22440	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Violet	—	Reddish Violet	HUE: Daylight
Normal — — — Good —	Normal — — 100 Fairly good —	Normal — — 100 Fairly good—good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate stained Silk and wool dyed to same depth as cotton but redder	Acetate slightly stained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4-5 4 — — 4 — 1-2 — 1-2 —	ISO 3 4-5 3 2 2 3 2-3 — 2-3 —	ISO 5 3 4 1 1 2 3-4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good	Neutral: good; alkaline: fairly good	Neutral: very good; alk- aline, good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 44—48:1

C.I. Direct Violet	44	45	46
CHEMICAL CLASS		Disazo	Monoazo (metallised)
C.I. CONSTITUTION NUMBER		22510	17515
HUE: Daylight		Violet	Reddish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Sustainable aftertreatment	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Violet 26	Normal B — — —	Normal A — 20-40 Good —
OTHER FIBRES Dyeing Staining		Acetate stained Silk dyed deeper than cotton and wool much deeper than cotton. Viscose dyed same depth as cotton	Acetate stained Nylon dyed Silk and wool dyed heavier than cotton
PRINTING			Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO 4-5 4 1 1-2 2 2 1-2 — 1-2 —	AATCC ISO 4 4 5 4 4 3 — 5-6 5-6 6 — 6 1 1-2 — — 1-2 1-2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Very good	Cellulose: neutral, fairly good, alkaline, good Silk: neutral, fair-fairly good Unaffected Duller and weaker
NOTES AND NON-TEXTILE USAGE			Anodised aluminium Leather: on chrome and vegetable tannages Paper: better dyeing Reactions in substance H ₂ SO ₄ conc.—dark red, on diln—brown ppt NaOH 10%—violet (incomplete)

47	48	48:1	C.I. Direct Violet
Disazo 25410	Disazo 29125		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Violet (Direct)	Bluish Violet (Direct)		HUE: Daylight
Normal B Good 80-100 — 4	Normal B — 100 — 4	Slightly different chemically from C.I. Direct Violet 48 but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral or acetic acid + Glauber's salt Silk and wool dyed much lighter than cotton, acetate unstained, nylon sl. stained. Dyed cold, cellulose dyed, silk and wool unstained	Silk: neutral Silk and wool somewhat lighter and redder than cotton. Acetate unstained to stained Nylon heavily stained		OTHER FIBRES Dyeing Staining
Viscose: urea process	Cellulose: urea process with addition of disodium orthophosphate		PRINTING
AATCC (Direct) 2-3 4 3 — 7 — 2 — 2 — AATCC (4) 2-3 4 5 — 7 — 3 — 5 — ISO (Direct) 3-4 5 3 7 7-8 7-8 2 — 2-3 — ISO (4) 3-4 4-5 3 6 7 7 4-5 — 5 —	AATCC (Direct) 4-5 5 5 4 5 6 1 — 3 — AATCC (4) 4 4 4 5-6 6 6-7 4 — 3-4 — ISO (Direct) 3-4 4 4 5-6 6 6-7 3 — 2-3 — ISO (4) 4-5 4 3-4 5 6 6 3 — 5 —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Direct, neutral: fairly good, alkaline: good. Aftertreated, alkaline with anthraquinone: good Yellower and duller Yellower	Direct, neutral: fairly good, alkaline: fair. Aftertreated, alkaline with anthraquinone: good Unaffected Unaffected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: beater dyeing and for coating Plastics Soap: as a shading component Leather: see Leather Dyes section	Heavy metal salts as pigments Leather: on chrome and vegetable tannages Paper: beater dyeing Regenerated-cellulose film and vegetable-ivory buttons		NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 49—54

C.I. Direct Violet	49	50	51
CHEMICAL CLASS	Disazo (metallised)		Disazo
C.I. CONSTITUTION NUMBER	■		27905
HUE: Daylight	Bluish Violet	Bright Bluish Violet	Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good —	Normal — — — Very good —	Normal A Good 40 — —
OTHER FIBRES Dyeing Staining	 Silk and wool dyed much lighter than cotton Acetate slightly stained	 Acetate unstained	Wool: ammonium acetate and Glauber's salt. Silk: acetic acid and Glauber's salt. Nylon: neutral or padded with ammonium tartrate Silk dyed lighter and wool somewhat heavier and redder than cotton Acetate stained, nylon dyed
PRINTING			Cellulose: urea process with addition of disodium orthophosphate Nylon: ammonium tartrate
FASTNESS PROPERTIES Method	ISO	ISO	AATCC ISO
Acid (organic)	1	2	4 3-4
Alkali	2	5	4 4
Hot pressing	4-5	2	2 1-2
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	4	— 3-4
normal	6	4	3-4 3-4
2 × normal	—	4-5	— 4
Washing — alteration	3	1	2 2
staining	—	—	— —
Water — alteration	—	1	2 1-2
staining	—	—	— —
OTHER PROPERTIES Dischargeability	Neutral: fair	Neutral and alkaline: good	Neutral and alkaline: good
Effect of metals — Copper Iron	Slightly duller Duller and weaker		Little weaker Little weaker, little duller
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—deep purple; on diln—reddish violet and ppt NaOH 10%—reddish violet (partly soluble) *Constitution closely related to C.I. 29125		Leather: see Leather Dyes section Paper: beater dyeing, good light fastness Regenerated-cellulose film Vegetable-ivory buttons Aqueous inks Casein-formaldehyde plastics Soap Reactions on cellulose H ₂ SO ₄ 10%—blue NaOH 10%—bright bluish violet

52	53	54	C.I. Direct Violet
Disazo	Azo	Oxazine 51325	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Violet (Direct)	Bluish Violet	Bright Violet	HUE: Daylight
Normal — Fair — Good 6	Normal B — — Very good —	Normal — — Affinity poor at low temp. Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk (redder than cotton)	Silk: formic acid		OTHER FIBRES Dyeing
Wool heavily stained Acetate and nylon unstained	Wool and silk stained much redder than cotton Acetate unstained	Acetate stained Silk dyed heavier than cotton, wool lighter than cotton	Staining
		Cellulose: direct and as il- luminating colour in for- maldehyde sulphonylate dis- charges	PRINTING
AATCC 4 2 5 — 7 — 3* — 2 —	ISO 4* 3-4 3 4 5 6 2 — 2 —	ISO 2-3 4 3-4 5-6 6 6-7 1-2 — 2-3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Stable to crease-recovery finishes Unaffected Redder and duller	Neutral and alkaline: poor Stable to crease-recovery finishes Unaffected Unaffected	Not dischargeable Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
*Can be improved by after- treatment 6 Reactions in substance H ₂ SO ₄ conc.—bright bluish violet, on diln—bright red- dish blue	*Mineral acid Paper: beater dyeing Reactions in substance H ₂ SO ₄ conc.—dull reddish violet		NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 55—60

C.I. Direct Violet	55	56	57
CHEMICAL CLASS		Monoazo (metallised)	Disazo
C.I. CONSTITUTION NUMBER		17510	27865
HUE: Daylight	—	Violet	Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Violet 46	Very similar in properties and usage to C.I. Direct Violet 46	Normal B Fairly good 100 — —
OTHER FIBRES Dyeing Staining			Acetate stained
PRINTING			Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			ISO 4—5 4—5 4 5 5—6 6 3 — 3—4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			Neutral and alkaline: very good Slightly affected —
NOTES AND NON-TEXTILE USAGE			Paper

58	59	60	C.I. Direct Violet
Disazo		Azo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Reddish Violet	Dull Violet	Reddish Violet	HUE: Daylight
Normal — Good 80 — Good—very good —	Normal C — 80 — —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate stained	Acetate unstained	Acetate unstained Nylon slightly stained Wool and silk dyed to same depth as cotton	OTHER FIBRES Dyeing Staining
Cellulose: direct			PRINTING
ISO 4-5 4 4-5 4 4-5 5 2 — 2 —	ISO 4 4 4-5 5-6 6 6-7 4 — 4 —	AATCC 3 3 4 — 6-7 — 2 — 3 — Good fastness to light and washing on silk	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good—very good Covers irregular-dyeing viscose — —	Neutral: fairly good, alkaline: fair Trace affected Slightly affected	Cellulose, neutral: fair—fairly good Silk: poor Unaffected Weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper Reactions in substance H ₂ SO ₄ conc.—bluish black, on diln—reddish violet ppt		Leather: on chrome and vegetable tan- nages Paper: beater dyeing and for surface colouring Reactions in substance H ₂ SO ₄ conc.—dull violet, on diln—red ppt NaOH 10%—violet	NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 61—66

C.I. Direct Violet	61	62	63
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER		25400	28190
HUE: Daylight	Reddish Violet	Bright Reddish Violet	Reddish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Good—very good —	Normal — — — — —	Normal — — — — —
OTHER FIBRES Dyeing Staining		Silk	Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 4-5 4 4* 4* 4-5* 2* — 2* —	ISO 3 5 3 4-5 5 5-6 2 — 2 —	ISO 3 4 3 — 5 — 2-3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good—very good; alkaline: very good	Neutral and alkaline: good— very good	Very good
NOTES AND NON-TEXTILE USAGE	*Somewhat improved by after- treatment 3 which however reduces somewhat the ease of dischargeability Paper		

64	65	66	C.I. Direct Violet
Disazo 28200	Azo	Disazo 29120	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Violet	Violet	Violet	HUE: Daylight
Normal — — — — —	Normal — — — Fairly good—good —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate unstained Silk, wool and nylon dyed lighter than cotton	Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2-3 4 3 — 5 — 2-3 — 3 —	ISO 5 4 3 6 7 7 4 — 2-3 —	ISO 1-2 2 4 — 6-7 — 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Neutral and alkaline: fairly good Unaffected Considerably affected	Neutral: fair	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet	67	68	69
CHEMICAL CLASS	Trisazo	Trisazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Violet (8)	Violet (8)	Violet (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good 8	Normal — Good — Good 8	Normal — — — Good 8
OTHER FIBRES Dyeing Staining	 Acetate slightly stained Nylon heavily stained Silk and wool dyed much lighter than cotton	 Acetate slightly stained Nylon heavily stained Silk and wool dyed much lighter than cotton	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 3 3 2 3 4 (II) 4 — 5 —	AATCC (8) 5 2-3 3 2 3 4 (II) 4-5 — 5 —	ISO (8) 3-4 5 — — 2-3 — 2-3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Appreciably weaker Noticeably redder	Neutral: very good Considerably weaker and duller Noticeably yellower	Neutral and alkaline: very good
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—dull violet, on diln—red and ppt Reactions on cellulose H ₂ SO ₄ 10%—no effect NaOH 10%—slightly redder	Reactions in substance H ₂ SO ₄ conc.—brown, on diln —brown and violet ppt Reactions on cellulose H ₂ SO ₄ 10%—bluer NaOH 10%—bluer	

70	71	72	C.I. Direct Violet
	Disazo	Disazo 28270	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Violet (8)	Dull Violet (8)	Dull Violet (8)	HUE: Daylight
Normal — — Good 8	Normal — Good Good 8	Normal — — 60 Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate unstained Nylon heavily stained Silk and wool dyed much lighter than cellulose	Acetate stained Wool dyed lighter than cotton	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (8) 3-4 5 3 — 2-3 — 2-3 — 3 —	AATCC (8) 3 5 3 — 4 — 3 — 5 —	ISO (8) 2-3 4 2-3 4 4 4-5 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good	Neutral: good Bluer and duller Slightly duller	Neutral and alkaline: good— very good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Reactions in substance H ₂ SO ₄ conc.—dull bluish green, on diln—dull bluish violet and ppt NaOH 10%—slightly redder and brighter		NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 73—78

C.I. Direct Violet	73	74	75
CHEMICAL CLASS			Disazo
C.I. CONSTITUTION NUMBER			*
HUE: Daylight	Reddish Violet (8)	Dull Reddish Violet (8)	Dull Bluish Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 8	Normal — — — Good 8	Normal — Good — Good —
OTHER FIBRES Dyeing Staining			Acetate heavily stained Nylon dyed Silk and wool dyed to same depth as cotton
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (8) 3 5 2-3 — 2 — 3 3-4 —	ISO (8) 4 4 — — 3 — 2-3 3 —	AATCC 3 3 4 — 2 — 3 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good	Neutral and alkaline: very good	Neutral: good Unaffected Duller
NOTES AND NON-TEXTILE USAGE			*Related to C.I. 23400 Leather: on chrome and vegetable tannages Reactions in substance H ₂ SO ₄ conc.—blue, on diln—violet ppt

76	77	78	C.I. Direct Violet
	Disazo 28725	Disazo 28720	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Violet (8)	Bluish Violet (8)	Reddish Violet (8)	HUE: Daylight
Normal — — 80 Fair 8	Normal — — — 8	Normal — — — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acetic acid Wool slightly stained Acetate unstained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO (8) 2-3 3-4 4 3 4 4 3-4 4 —	ISO (8) 3 5 4 3 4 4 3 — 3-4 —	ISO (8) 3 5 4 3 3 4 3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: good—very good, alk- aline: fairly good—good Little bluer Bluer and duller	Neutral and alkaline: poor	Neutral and alkaline: poor	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 79—84

C.I. Direct Violet	79	80	81
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22780	25420	25355
HUE: Daylight	Bluish Violet→Reddish Blue (3)	Bluish Violet→Reddish Blue (3)	Dull Violet (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 — 3	Normal — — 100 — 3	Normal — — 80 — 3
OTHER FIBRES Dyeing Staining			
PRINTING	Cellulose: direct	Cellulose: direct	Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (3) 3-4 3-4 4 5-6 6 6-7 4 — 4-5 —	ISO (3) 2-3 2-3 3 5-6 6 6-7 4 — 4-5 —	ISO (3) 3 5 3 5-6 6 6-7 4 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good—good, alk- aline with anthraquinone: good Unaffected Unaffected	Neutral: fairly good; alkaline with anthraquinone: good Unaffected Unaffected	Neutral: fair; alkaline with anthraquinone: fairly good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE			

82	83	84	C.I. Direct Violet			
Disazo	Disazo 25280		CHEMICAL CLASS C.I. CONSTITUTION NUMBER			
Bluish Violet (3)	Bright Violet (Direct)	Violet (3 and 4)	HUE: Daylight			
Normal C — — — 3	Normal — Fairly good — Good 6	Normal C — 50–60 — 3, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
Silk and wool dyed lighter than cotton	Silk, wool and nylon heavily stained Acetate slightly stained	Wool dyed bluer and duller than cotton Acetate slightly stained Nylon stained	OTHER FIBRES Dyeing Staining			
Cellulose: urea process with addition of NaOH, Na ₂ HPO ₄ and a solubilising agent followed by steaming and after-coppering			PRINTING			
AATCC (3) 1 2 5 — 5–6 — 4 — 5 —	ISO (3) 4 4 4 5–6 6 6–7 4–5 — 4–5 —	AATCC (Direct) 1–2 3 3 — 5 — 2 — 2 —	AATCC (6) 1–2 3 3 — 5 — 3 — 3 —	ISO (3) 4–5 3 4–5 5–6 7 8 3–4 — 4–5 —	ISO (4) 4–5 3 5 5–6 6–7 7–8 4–5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good; alkaline: fairly good–good — —	Neutral: good Slightly duller Unaffected	Fairly good (3) Good–very good (4) Unaffected Somewhat affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
Paper	Leather: on chrome tannage		NOTES AND NON-TEXTILE USAGE			

C.I. Direct Violet 85—92

C.I. Direct Violet	85	86	87
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	22520		29232
HUE: Daylight	Dull Bluish Violet (Direct)	Violet (6)	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fairly good — Good 6	Normal — Good — Good 6	Normal — — — — —
OTHER FIBRES Dyeing Staining	— Silk and wool heavily stained Acetate unstained Nylon stained	 Acetate slightly stained Silk and wool dyed to same depth as cotton	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (Direct) 3 5 3 — 5 — 2 — 3 —	AATCC (6) 3 5 5 — 5 — 3-4 — 5 —	AATCC (6) 5 4 2 — 2-3 — 2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Little bluer Duller	Neutral: good Unaffected Redder and duller	
NOTES AND NON-TEXTILE USAGE		Reactions in substance H ₂ SO ₄ conc.—blue, on diln. violet ppt NaOH 10%—practically in- soluble (brownish)	

88	89	90	91, 92	C.I. Direct Violet
Disazo 22046	Disazo (metallised)	Azo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Reddish Violet	Bluish Violet Artificial light: Red- der		HUE: Daylight
Normal — — — — —	Normal — — Affinity rises regularly with temp. Very good 5	Normal — — — — 3	These C.I. Gen- eric Names are discontinued	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate slightly stained Wool and silk stained			OTHER FIBRES Dyeing Staining
				PRINTING
	ISO (Direct) 2 4 — 6 7 7 3 — 3 —	ISO (5) — — — 5 5-6 6 — — —	AATCC (3) — — 5 — 6-7 — 4-5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral and alkaline: 4 4 — Slightly sensitive to hard water	Weaker —		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
				NOTES AND NON-TEXTILE USAGE

C.I. Direct Violet 93—98

C.I. Direct Violet	93	94	95
CHEMICAL CLASS	Disazo	Azo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Violet Artificial light: Redder	Reddish Violet (Direct) Artificial light: Redder Bluer (3)	Bright Violet
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 95 Good 3		Normal B Fair 60 Poor 5
OTHER FIBRES Dyeing Staining	 Acetate slightly stained Nylon heavily stained		 Acetate unstained Silk and nylon slightly stained Wool stained
PRINTING	Cellulose: direct with cop- per sulphate aftertreatment		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) 5 3-4 4-5 6-7 7 7-8 4-5 3-4 5 5	AATCC — — 5 — 6 — 4 — 5 —	ISO (Direct) 5 3-4 3 5 5-6 6 6-7 3 — 3-4 — ISO (5) — — 5 — 5-6 — 4 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Poor — Considerably affected		Neutral and alkaline: poor Unaffected Slightly duller and weaker
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage with aftertreatment with copper sulphate Fastness to light practically unimpaired by resin finish		Fastness to light is not signifi- cantly impaired by resin finishing Reactions in substance H ₂ SO ₄ conc.—reddish blue, on dila—no change

96	97	98	C.I. Direct Violet
Azo	Monoazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Violet	Bluish Violet	Reddish Violet	HUE: Daylight
Normal — Very good 80–100 Moderate —	Alkaline in presence of Glauber's salt — — — — —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate stained Wool heavily stained	Wool stained dull violet, silk duller than wool Nylon stained reddish violet		OTHER FIBRES Dyeing Staining
Cellulose: urea process			PRINTING
ISO 5 3 4 6 6–7 7 2–3 2 2–3 2	ISO 3 4–5 4 — — — 3 3 3 2–3		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: 3; alkaline: 3–4 5 4	Little weaker Little weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome and vegetable tannages Paper			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue	1	2																																																																																																			
CHEMICAL CLASS	Disazo	Disazo																																																																																																			
C.I. CONSTITUTION NUMBER	24410	22590																																																																																																			
HUE: Daylight	Bright Greenish Blue (Direct)	Dull Blue (Direct) Bluish Black (8) Black (9)																																																																																																			
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Very good 60–80 — 3 (greener in hue)	Normal C Very good 60–80 — 8, 9																																																																																																			
OTHER FIBRES Dyeing Staining	Nylon: by padding with ammonium tartrate Silk and wool dyed lighter than cotton. Acetate and nylon unstained. Cold, silk and wool practically unstained	 Silk and wool dyed much lighter than cotton Nylon heavily stained. Cold, silk and wool almost unstained																																																																																																			
PRINTING	Cellulose: urea process with disodium ortho-phosphate Nylon: with ammonium tartrate																																																																																																				
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	<table><tr><td>AATCC Direct</td><td>AATCC (3)</td><td>ISO Direct</td><td>ISO (3)</td></tr><tr><td>5</td><td>5</td><td>5</td><td>5</td></tr><tr><td>1</td><td>1</td><td>4</td><td>2</td></tr><tr><td>3</td><td>3</td><td>3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>1</td><td>5</td></tr><tr><td>1</td><td>3</td><td>1</td><td>5–6</td></tr><tr><td>—</td><td>—</td><td>1–2</td><td>6</td></tr><tr><td>(I) 3–4</td><td>I (3–4)</td><td>2</td><td>2–3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>1</td><td>1</td><td>2</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (3)	ISO Direct	ISO (3)	5	5	5	5	1	1	4	2	3	3	3	3	—	—	1	5	1	3	1	5–6	—	—	1–2	6	(I) 3–4	I (3–4)	2	2–3	—	—	—	—	1	1	2	4	—	—	—	—	<table><tr><td>AATCC Direct</td><td>AATCC (9)</td><td>ISO Direct</td><td>ISO (8)</td><td>ISO (9)</td></tr><tr><td>3</td><td>5</td><td>4</td><td>4–5</td><td>4–5</td></tr><tr><td>3</td><td>2</td><td>4</td><td>4–5</td><td>4</td></tr><tr><td>3</td><td>3</td><td>3</td><td>4</td><td>3–4</td></tr><tr><td>—</td><td>—</td><td>1</td><td>1–2</td><td>1–2</td></tr><tr><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td></tr><tr><td>—</td><td>—</td><td>3</td><td>3</td><td>3</td></tr><tr><td>(I) 3</td><td>(II) 3</td><td>2</td><td>3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>3</td><td>2</td><td>3–4</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (9)	ISO Direct	ISO (8)	ISO (9)	3	5	4	4–5	4–5	3	2	4	4–5	4	3	3	3	4	3–4	—	—	1	1–2	1–2	3	3	2	2	2	—	—	3	3	3	(I) 3	(II) 3	2	3	3	—	—	—	—	—	3	3	2	3–4	4	—	—	—	—	—
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—	—	3	3	3																																																																																																	
(I) 3	(II) 3	2	3	3																																																																																																	
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3	3	2	3–4	4																																																																																																	
—	—	—	—	—																																																																																																	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good–very good Somewhat greener Practically unaffected	Good–very good Practically unaffected Practically unaffected																																																																																																			
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Paper: beater dyeing. Fastness on paper: NaOH 1%, poor; H ₂ SO ₄ 1%, very good; light, fair; water, good Heavy metal salts have pigment usage Biological stain Aqueous writing inks	Leather: see Leather Dyes section Paper: beater dyeing																																																																																																			

C.I. Direct Blue 3—8

C.I. Direct Blue	3	4	5
CHEMICAL CLASS	Disazo	Disazo	
C.I. CONSTITUTION NUMBER	23705	24380	
HUE: Daylight	Dull Reddish Blue (Direct)	Blue (Direct)	Dull Blue
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	C	—	—
Exhaustion	Very good	Good	—
Temp. of maximum affinity °C	100	—	—
Levelling	—	Fairly good	—
Suitable aftertreatment	8	3, 6, 7	—
OTHER FIBRES			
Dyeing	Silk		
Staining	Silk and wool dyed lighter than cotton. Nylon dyed, acetate stained	Silk and wool dyed much lighter than cot- ton. Acetate and nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES			
Method	AATCC Direct	ISO Direct	ISO (8)
Acid (organic)	5	4	5
Alkali	2-3	4	5
Hot pressing	4	2-3	3-4
Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal	1	1	1-2
normal	2	1	2
2× normal	3	2	2-3
Washing — alteration	(I) 3	1-2	3
staining	—	—	—
Water — alteration	2	2	3-4
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Neutral: fair-fairly good Alkaline: fairly good-good	Direct: neutral, good-very good	
Effect of metals — Copper Iron	Unaffected Practically unaffected	Slightly greener, duller Slightly greener, duller	
NOTES AND NON-TEXTILE USAGE			

6	7	8	C.I. Direct Blue
Disazo	Disazo	Disazo 24140	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue (Direct) Bluish Grey (8) Greenish Grey (10)	Blue	Blue (Direct) Dull Greenish Blue (3)	HUE: Daylight
Normal B Good 40-80 — 8, 10	Normal — — — — —	Normal B Good 80-100 — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Nylon heavily stained. Cold, wool and silk almost unstained		Silk: Glauber's salt and acetic acid Silk and wool dyed lighter than cotton. Acetate stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process		Cellulose: discharge	PRINTING
AATCC Direct 5 2 3 — 1 — (I) 1-2 1 —	ISO 5 5 3 — 2 — 3 — —	AATCC Direct 5 1 3 — 1-2 — (I) 1 1 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
ISO Direct 4-5 3 3 1 1-2 2 1-2 — —	ISO (8) 4 3 3 1 2 2-3 3 — —	ISO (3) 4-5 2 4 1 4-5 5 1-2 — —	
Good-very good Somewhat redder Somewhat redder		Direct: very good. After-treated: fairly good-good Redder, duller Little duller Somewhat sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — copper Iron
Leather: see Leather Dyes section Paper: beater dyeing. Good retention in presence of chalk filler. Fastness props: NaOH 1%, poor-fair; H ₂ SO ₄ 1%, poor; light, fair; water, good Aqueous writing inks Biological stain	Similar in properties and usage to C.I. Direct Blue 6	Paper: beater dyeing. Good retention in presence of chalk filler. Fastness props: NaOH 1%, poor; H ₂ SO ₄ 1%, very good; light, fair; water, good Biological stain	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 8:1—12

C.I. Direct Blue	8:1	9	10
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER		24155	24340
HUE: Daylight	Blue	Blue (Direct)	Blue (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Blue 8, but similar in properties and usage	Normal — — — Good 3	Normal B Fairly good—good 60 — 3
OTHER FIBRES Dyeing Staining		Silk and wool heavily stained, acetate slightly stained	Silk and wool dyed lighter than cotton. Acetate unstained, nylon heavily stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 3-4 4 3 — 2 — 1-2 2 —	ISO (3) — — — 4 — 3-4 2 3 4 2 3 4 1-2 — — 2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Very good	Good—very good Weaker Greener
NOTES AND NON-TEXTILE USAGE			Leather: occasional use on chrome tannage Paper: beater dyeing

11	11:1	12	C.I. Direct Blue
Trisazo 30350	Trisazo	Disazo 24170	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Blue	Dull Blue	Blue	HUE: Daylight
Normal B Good — — —	Slightly different chemically from C.I. Direct Blue 11, but similar in properties and usage	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed equal to cotton. Acetate unstained, nylon dyed			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC ISO 5 5 4 4 5 4 — 1 1-2 2 — 2 (I) 4 3-4 1 3 — —		ISO 3 5 4 — 2 — 1-2 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good Much redder, weaker Much greener		Neutral: good Alkaline: fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage Paper: beater dyeing			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 13—18

C.I. Direct Blue	13	14	15
CHEMICAL CLASS		Disazo	Disazo
C.I. CONSTITUTION NUMBER		23850	24400
HUE: Daylight	Navy (Direct)	Blue	Blue Dull Blue (3) Dull Bluish Green (10)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good—very good 2	Normal B Very good 60–80 — —	Normal B Very good 60–80 — 3, 10
OTHER FIBRES Dyeing Staining	 Silk dyed much lighter than cotton, wool lighter. Acetate stained	 Silk dyed much lighter than cotton, wool lighter. Acetate unstained, nylon heavily stained	 Silk dyed much lighter than cotton, wool lighter. Acetate unstained, nylon slightly stained. Silk and wool reserved cold
PRINTING	Cellulose: urea process with disodium orthophosphate	Cellulose: occasional use for discharge prints	
FASTNESS PROPERTIES Method	ISO Direct	AATCC	AATCC
Acid (organic)	3	5	5
Alkali	5	2	4
Hot pressing	4	3	3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	1	—	—
normal	2	1–2	1–2
2 × normal	3	—	2
Washing — alteration	2	(I) 2	(I) 2
staining	—	—	—
Water — alteration	3	1	1
staining	—	—	—
OTHER PROPERTIES Dischargeability	Direct: neutral, very good; alkaline, fairly good Aftertreated (2): fairly good	Neutral: good—very good Alkaline: good	Direct: good Aftertreated (3): good Developed (10): good—very good
Effect of metals — Copper Iron	Somewhat affected Practically unaffected	Practically unaffected Practically unaffected	Somewhat duller —
NOTES AND NON-TEXTILE USAGE	Paper	On viscose the light fastness is improved by crease-resist finishes Leather: see Leather Dyes section Paper: beater dyeing, good retention in presence of chalk Biological stain Therapeutic use in treatment of sleeping sickness	On viscose, light fastness improved by crease-resist finishes Leather: see Leather Dyes section Paper: beater dyeing Biological stain Tint for cinematograph films

16	17	18	C.I. Direct Blue
Disazo 22475			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Violet→ Reddish Navy	†Reddish Blue (Direct)	Blue	HUE: Daylight
Normal — — — — —	Normal — — — Good 2	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed much lighter than cotton. Acetate stained, nylon heavily stained	Wool dyed equal to cotton Silk unstained at 80°C Acetate stained	Silk and wool dyed much lighter. Acetate stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate		PRINTING
ISO 5 4 4 — 1 — 2 — — —	ISO Direct ISO (2) 4 4 1 2 2-3 5 1 4-5 1 5 1 6 3-4 2-3 — — 2 1-2 — —	AATCC 2-3 2 3 — 1-2 — (I) 2 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Direct: very good Aftertreated: good Somewhat affected Somewhat affected	Neutral: good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper dyeing †Hue becomes slightly redder and duller with aftertreatment (2)	Paper dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 19—23

C.I. Direct Blue	19	20	21			
CHEMICAL CLASS	Disazo	Disazo	Disazo			
C.I. CONSTITUTION NUMBER	22485		23710			
HUE: Daylight	Reddish Blue→Reddish Navy	Dull Bluish Violet→Reddish Navy (Direct) Bluish Black (8), Black (9)	Blue→Dull Reddish Blue			
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — —	Normal C — 40–80 — 8, 9	Normal B Fairly good; alkaline, good 80–100 — —			
OTHER FIBRES Dyeing Staining	 Silk stained, wool heavily stained Acetate unstained	 Silk and wool dyed lighter than cotton Acetate and nylon stained	 Silk and wool dyed much lighter and redder than cotton. Acetate stained, nylon heavily stained			
PRINTING			Cellulose: discharge			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 5 3 1 1 1–2 2 — 2 —	ISO Direct 3–4 4 4 1 2 2 3–4 — 3–4 —	ISO (8) 4 3 4 2 3 4 3–4 — 5 —	ISO (9) 4 3 4–5 — 3 — 2–3 — 5 —	AATCC 3 3 3 — 2 — (1) 2 3 —	ISO 5 3–4 3 1 1 2 1–2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good — —	Direct: good Developed (8): fairly good Developed (9): fair Practically unaffected Practically unaffected	Neutral: good–very good Alkaline: good Little redder Little redder			
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section Paper: beater dyeing	Leather: on chrome tannage and occasionally on vegetable tannage Paper: limited use for beater dyeing			

21:1	22	23	C.I. Direct Blue
Disazo	Disazo 24280	Disazo 24405	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue→Dull Reddish Blue	Blue (Direct)	Blue (Direct)	HUE: Daylight
Slightly different chemically from C.I. Direct Blue 21, but similar in properties and usage	Normal C Good 80 — 3	Normal — Good — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: Glauber's salt and acetic acid Nylon: by padding, with ammonium tartrate Silk dyed equal to cotton, wool lighter and redder. Acetate stained, nylon dyed	 Silk and wool dyed much lighter. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining
	Nylon: with ammonium tartrate for fixing		PRINTING
	AATCC Direct 5 3-4 3 — 1-2 — (I) 3-4 — 2-3 —	AATCC Direct 5 5 3 — 2 — (II) 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Direct: very good Aftertreated: fairly good-good Silk, direct: neutral, good Somewhat redder Duller	Neutral: fairly good-good Alkaline: good Slightly duller Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: see Leather Dyes section Paper: occasional use in beater dyeing Heavy metal salts have pigment usage Occasional use for colouring soap	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 24—28

C.I. Direct Blue	24	24:1	25
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER			23790
HUE: Daylight	Reddish Navy	Reddish Navy	Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good — — —	Slightly different chemically from C.I. Direct Blue 24, but similar in properties and usage	Normal A Fair 60–80 — —
OTHER FIBRES Dyeing Staining	Silk and nylon: Glauber's salt and acetic acid Silk and wool dyed equal to cotton. Acetate slightly stained, nylon heavily stained		Silk dyed much lighter than cotton, wool lighter. Acetate slightly stained, nylon unstained. Cold, silk and wool almost unstained
PRINTING	Wool and silk: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC ISO 2 — 4 — 5 4 2 1 2–3 1–2 3–4 1–2 (I) 3 3–4 — — 2 3 — —		AATCC ISO 5 5 2 3–4 3 3–4 — 1 1–2 2 — 3 (I) 1 1–2 — — 1 1–2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good–very good Redder Duller		Good–very good Weaker Greener
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage Paper: occasional use for beater dyeing and coating		Leather: see Leather Dyes section Paper: beater dyeing

26	27	28	C.I. Direct Blue
Trisazo 31930	Disazo 23750	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Navy (Direct)	Reddish Blue	Dull Greenish Blue	HUE: Daylight
Normal, alkaline B Very good 100 — 2, 6	Normal B Good — — —	Normal A — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk dyed much lighter than cotton, wool lighter. Acetate and nylon stained. Cold, silk and wool almost unstained	Silk and wool dyed equal to cotton. Acetate and nylon heavily stained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC Direct 4 2 5 1 2 3 (I) 1-2 — 2-3 — AATCC (2) 5 2 5 — 4 — (II) 4 — 5 — ISO Direct 4-5 3 4-5 1 2 3 2-3 — 4 — ISO (2) 4-5 3 4-5 3 3-4 4-5 3 — 4-5 —	AATCC 4-5 2 3 — 1-2 — (I) 1 — 1 — ISO 4-5 3 3 1 1 1 3-4 — 2 —	ISO (on viscose) 2 3-4 2 2 3 3-4 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: good—very good Aftertreated (2): good Unaffected Unaffected Somewhat sensitive to hard water	Fairly good Trace weaker Unaffected	Very good Unaffected Greener	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage Paper: beater dyeing	Leather: occasional use on chrome tannage. Suitable for finish colouring Paper: occasional use; good retention in presence of chalk	Covers irregular quality viscose yarn	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 29—34

C.I. Direct Blue	29	30	31
CHEMICAL CLASS	Disazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	27890	31955	23690
HUE: Daylight	Reddish Blue	Dull Greenish Blue	Reddish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — 40–60 Good —	Normal — Poor — Fair —	Normal — — — — —
OTHER FIBRES Dyeing Staining		Silk: Glauber's salt and acetic acid Silk and wool dyed lighter and much redder than cotton. Acetate and nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (on viscose) 3 3–4 2 3 4 4–5 3 — 3 —	AATCC ISO 5 3–4 4–5 4 3–4 2–3 2 2 2–3 3 3 4 (I) 3 1–2 — — 1–2 1–2 — —	ISO 5 3 3–4 1 2 3 1–2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Trace greener Duller	Neutral: good—very good Alkaline: good Slightly redder Slightly redder and duller	Good
NOTES AND NON-TEXTILE USAGE	Covers irregular-dyeing viscose	Leather: see Leather Dyes section	Biological stain

32	33	34	C.I. Direct Blue
	Trisazo 31635	Trisazo 32055	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Navy Blue	Reddish Navy	Blue	HUE: Daylight
Normal — — — — —	Normal — — 80 Fair —	Normal — — 80 Fair —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk dyed much lighter than cotton, wool lighter. Acetate stained	Silk dyed much lighter than cotton, wool lighter. Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 5 4 2-3 — 2 — 1-2 2 —	ISO 4 4 3 2 3 4 1-2 1 —	ISO 4 5 4 4 4-5 5 1-2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —	Good Little duller Unaffected	Neutral: good—very good Alkaline: good Unaffected Unaffected Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 35—40

C.I. Direct Blue	35	36	37
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	24145	24150	24270
HUE: Daylight	Blue	Blue	Bright Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 80 Good —	Normal — — 80 Good —	Normal — — — Good —
OTHER FIBRES Dyeing Staining	 Silk dyed much lighter than cotton, wool lighter Acetate stained	 Silk dyed equal to cotton, wool lighter Acetate stained	 Silk and wool dyed much lighter than cotton Acetate slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 3 2-3 1 2 2 1-2 — 1 —	ISO 4-5 3 3 1 2 2 1-2 — 1-2 —	ISO 4 3-4 3 — 1-2 — 2 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Alkaline: fairly good-good Trace redder Unaffected	Good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE			

38	39	40	C.I. Direct Blue
Trisazo 30090	Trisazo 30390	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Blue	Dull Greenish Blue	Bright Blue	HUE: Daylight
Normal — — — — —	Normal — — — Good —	Normal A — 40-60 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk dyed lighter than cotton, wool heavier and duller Acetate slightly stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 3 4-5 3 — 2 — 1-2 — 1-2 —	ISO 5 4 3 — 2 — 1 — 1-2 —	ISO 4 3-4 2 2 3 3-4 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Good — —	Neutral: fairly good Alkaline: good-very good Practically unaffected Considerably affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Covers irregular-dyeing vis- cose Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 41—46

C.I. Direct Blue	41	42	43
CHEMICAL CLASS	Triphenylmethane	Disazo	Trisazo
C.I. CONSTITUTION NUMBER	42700	22505	30205
HUE: Daylight	Bright Greenish Blue	Reddish Blue	Dull Reddish Blue→Navy
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Very good —	Normal — — — — —	Normal — — — Very good —
OTHER FIBRES Dyeing Staining	 Silk and wool dyed heavier than cotton. Acetate slightly stained, nylon heavily stained	 	 Silk dyed much lighter than cotton, wool lighter and redder. Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC ISO 2-3 3-4 1 1 4 3 — — 1 1 — — (I) 1 1 — — 1 1 — —	ISO 4 4 3 — 1 — 2 — — —	ISO 3-4 5 3-4 1 2 2 1-2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Not dischargeable Unaffected Greener and weaker	Neutral: very good Alkaline: good—very good — —	Neutral: good—very good Alkaline: good Considerably changed Slightly affected
NOTES AND NON-TEXTILE USAGE	Covers irregular-dyeing viscose Leather: occasional use on chrome tannage Biological stain		Paper

44	45	46	C.I. Direct Blue
— —	Disazo 24310	Azo —	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Dull Blue	Dull Blue	HUE: Daylight
Normal B — 40-80 — —	Normal C — 40-100 — —	Normal — — — Very good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Acetate unstained	Silk and wool dyed equal to cotton Acetate slightly stained	Silk and wool much lighter than cotton. Dyed at 40°C wool almost reserved. Acetate stained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process with disodium phosphate Silk and wool: direct prints	PRINTING
AATCC ISO 4-5 5 4 4 3 4 1 1 2 2 3 3 (II) 3 4 — — 2-3 2-3 — —	AATCC ISO 4-5 5 4-5 4 3-4 3 1 1 2 1 3 2 (II) 2-3 4 — — 2-3 2-3 — —	ISO 4 5 4 1 1 2 2 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good Unaffected Slightly affected	Good Affected Slightly affected	Neutral: good-very good Alkaline: good Unaffected Slightly affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Covers irregular-dyeing viscose Unaffected by crease- resist finishes	Covers irregular-dyeing viscose Unaffected by crease- resist finishes	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 47—52

C.I. Direct Blue	47	48	49
CHEMICAL CLASS		Disazo	Disazo
C.I. CONSTITUTION NUMBER		22565	22540
HUE: Daylight	Navy	Dull Reddish Blue→Reddish Navy (Direct) Black (8)	Reddish Blue→Reddish Navy (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Poor — Good —	Normal — — — Good 8	Normal C — — — 1, 3
OTHER FIBRES Dyeing Staining			
	Silk and wool dyed much lighter than cotton, Acetate and nylon unstained		Silk dyed lighter than cotton, wool equal Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 4-5 4-5 3 — 3-4 — (I) 2-3 3-4 —	ISO 4-5 5 4-5 — 3 — 2 — 2 2	ISO Direct 5 3-4 3 1 1-2 2 2 — 2-3 — 2-3 — 2-3 — 2-3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good—very good — —	Fairly good—good — —	Good — —
NOTES AND NON-TEXTILE USAGE			

50	51	52	C.I. Direct Blue		
Disazo 24205	Trisazo 30340	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER		
Blue (Direct) becoming greener with (3)	Navy→Bluish Black (Direct)	Dull Bluish Violet→Reddish Navy (Direct)	HUE: Daylight		
Normal — — — Good 3	Normal — — — Good 8	Normal — Good — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		
		Silk and wool dyed somewhat lighter than cotton. Acetate slightly stained, nylon heavily stained	OTHER FIBRES Dyeing Staining		
			PRINTING		
ISO Direct 4-5 1-2 1 — 1-2 — 2 — — —	ISO Direct (3) 4-5 1-2 — — 2 — 2-3 — — —	ISO Direct (8) 3-4 4-5 4 — 5 — 3 — 3 3 —	AATCC Direct 5 5 3 — 2 — (I) 3 — 4 —	AATCC (6) 5 5 4 — 2 — (II) 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Good — —	Neutral: good Alkaline: moderate — —	Neutral: fairly good Unaffected Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		
		Leather: on chrome and occasionally on vegetable tannages	NOTES AND NON-TEXTILE USAGE		

C.I. Direct Blue 53—58

C.I. Direct Blue	53	54	55
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	23860	27960	27940
HUE: Daylight	Greenish Blue	Blue	Reddish Blue
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	A	A
Exhaustion	—	—	Good
Temp. of maximum affinity °C	60–100	—	80
Levelling	Very good	—	—
Suitable aftertreatment	—	—	—
OTHER FIBRES			
Dyeing			
Staining	Acetate unstained	Silk dyed equal to cotton, wool heavier. Acetate slightly stained	Silk dyed equal to cotton, wool lighter. Acetate slightly stained, nylon dyed
PRINTING	Cellulose, wool and silk: direct		Cellulose: urea process with disodium orthophosphate
FASTNESS PROPERTIES			
Method	ISO	ISO	AATCC ISO
Acid (organic)	5	5	2 4
Alkali	4–5	4–5	4 5
Hot pressing	4–5	3–4	3 3
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	1	2	— 3
normal	1–2	3	3 3
2 × normal	2	4	— 3
Washing — alteration	2	2	(I) 2 2
staining	—	—	— —
Water — alteration	2	2	2 2
staining	—	—	— —
OTHER PROPERTIES			
Dischargeability	Neutral: good–very good Alkaline: very good	Good	Good–very good
Effect of metals — Copper	—	—	Practically unaffected
Iron	—	—	Practically unaffected
NOTES AND NON-TEXTILE USAGE	Leather Paper		Almost unaffected by anti-crease finishes Paper

56	57	58	C.I. Direct Blue						
Azo		Disazo 22490	CHEMICAL CLASS C.I. CONSTITUTION NUMBER						
Blue	Blue (Direct) redder with aftertreatments 2 and 6	Dull Reddish Blue (Direct)	HUE: Daylight						
Normal B — — —	Normal C — 80–100 — 2, 6	Normal — — Good 1, 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment						
Wool dyed lighter than cotton Acetate unstained	Acetate stained	Silk dyed lighter and redder than cotton, wool lighter. Acetate stained	OTHER FIBRES Dyeing Staining						
	Cellulose: urea process		PRINTING						
ISO —* 2 3 1 1 1 3 — 2 —	AATCC Direct 5 4 3 1 2 3 (II) 4 — 3–4 —	AATCC (6) 5 4 3–4 1 2 3 (II) 4 — 4 —	ISO Direct 5 4 3 1 2 3 4 — 4 —	ISO (2) 4 3–4 4–5 4–5 6 6–7 4 — 4 —	ISO (6) 5 4 3 1 2 3 4 — 4 —	ISO Direct 2 2 4 2 2–3 3 1–2 — 1–2 —	ISO (1) 2 2 4 — 2–3 — 2 1–2 —	ISO (3) 2 2 4 — 3–4 — 2 — 1–2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good	Direct: neutral, good; alkaline, fairly good–good Aftertreated (2): fair Aftertreated (6): good	Fairly good	OTHER PROPERTIES Dischargeability						
Practically unaffected Greener	Slightly affected Slightly affected	—	Effect of metals — Copper Iron						
*Fastness to mineral acid 3–4 Paper			NOTES AND NON-TEXTILE USAGE						

C.I. Direct Blue 59—64

C.I. Direct Blue	59	60	61		
CHEMICAL CLASS		Disazo	Disazo		
C.I. CONSTITUTION NUMBER		23810			
HUE: Daylight		Reddish Navy (Direct)	Reddish Blue (Direct)		
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		Normal — — 80 Poor 7, 8	Normal — Good — Good 3		
OTHER FIBRES Dyeing Staining		Silk and wool dyed lighter than cotton. Acetate stained	Silk and wool dyed lighter than cotton. Acetate and nylon heavily stained		
PRINTING					
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2—1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 3 4 4 1 2 2 2 — 2 —	ISO (7) 3 3 2 2 3 4 3-4 — 3-4 —	ISO (8) 4 5 4 1 2 3 3-4 — 4 —	AATCC 3 5 3 — 1-2* — (I) 1-2* 2* — *improved by aftertreatment 3
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Direct: fairly good Aftertreatment (7): neutral, good; alkaline, fairly good Aftertreatment (8): good-very good Unaffected Unaffected	Neutral: good Unaffected Unaffected		
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section		Paper		

62	63	64	C.I. Direct Blue
Polyazo	Trisazo 31910	Disazo 22595	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Blue	Reddish Navy	Dull Blue	HUE: Daylight
Normal — Good — Good —	Normal — Poor — Fair —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool dyed equal to cotton Acetate unstained	Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton (bluish violet). Acetate and nylon heavily stained	Silk and wool dyed equal to cotton. Acetate unstained, nylon slightly stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 5 4 4 — 3 — (I) 3 4 —	AATCC ISO 5 3-4 4 4 3-4 2-3 1-2 2 2 3 2-3 3-4 (I) 3-4 2 — — 1-2 2-3 — —	AATCC 3 5 3 — 2 — (I) 1 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose and wool: neutral, very good — —	Neutral: good—very good Alkaline: good Unaffected Slightly duller	Neutral: good Unaffected Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: see Leather Dyes section	Leather: on chrome and occasionally vegetable tannages	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 65—70

C.I. Direct Blue	65	66	67
CHEMICAL CLASS	Disazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	24220		27925
HUE: Daylight	Reddish Blue (Direct)	Dull Greenish Blue	Reddish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — Very good—good —	Normal B Good — — —	Normal A — 80 — —
OTHER FIBRES Dyeing Staining	 Acetate slightly stained	 Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	 Silk and wool dyed lighter than cotton, wool redder and duller.* Acetate unstained, nylon heavily stained
PRINTING		Cellulose: direct	Cellulose: urea process with disodium orthophosphate
FASTNESS PROPERTIES Method	ISO	AATCC ISO	AATCC ISO
Acid (organic)	5	5 3	4 4
Alkali	5	3 —	3 4
Hot pressing	—	4 3-4	3 3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	— 3-4	— 4-5
normal	4	4 4	5-6 5
2 × normal	—	— 4-5	— 5-6
Washing — alteration staining	3	(I) 4 2-3	(I) 3 2
Water — alteration staining	3	3 2-3	4 2-3
—	—	— —	— —
OTHER PROPERTIES Dischargeability	Good	Very good	Good
Effect of metals — Copper Iron	— —	Redder Greener, little duller	Slightly greener Somewhat redder and duller
NOTES AND NON-TEXTILE USAGE	Light fastness improved considerably by aftertreatment with metallic salts	Leather: occasional use on chrome tannage Paper: beater dyeing	*Dyed cold cellulose dyed, silk and wool practically unstained Leather: see Leather Dyes section Paper: beater dyeing

68	69	70	C.I. Direct Blue
	Trisazo 34210	Trisazo 34205	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Reddish Navy	Blue	HUE: Daylight
Normal — Good—very good 100 Good —	Normal B — — — —	Normal — — 80 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed much lighter than cotton, wool lighter Acetate unstained	— Silk and wool dyed lighter than cotton Acetate unstained	Suitable for unweighted and weighted silk Silk dyed much lighter than cotton, wool lighter Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 5 3 4-5 5 5-6 2 — 2 —	ISO 4 4-5 3-4 4-5 5 5-6 3 — 3 —	ISO 3 5 3 4-5 4-5 5 1-2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good—very good Unaffected Unaffected	Neutral: very good Alkaline: good Slightly affected Considerably affected	Very good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper Leather: see Leather Dyes section	Paper Heavy metal salts have pig- ment usage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 71—75

C.I. Direct Blue	71	71:1	72
CHEMICAL CLASS	Trisazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER	34140		34145
HUE: Daylight	Dull Blue	Dull Blue	Dull Blue→Navy
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fairly good 80–100 — —	Slightly different chemically from C.I. Direct Blue 71, but similar in properties and usage	Normal B — 80 — —
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk dyed much lighter than cotton, wool lighter. Acetate slightly stained, nylon heavily stained		— Silk and wool dyed much lighter than cotton Acetate unstained
PRINTING	Cellulose: direct and discharge prints. Urea process with disodium orthophosphate		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC ISO 2 4 4 4–5 3 3 — 4–5 4–5 5 — 5–6 (I) 1–2 2 — — 2 2 — —		ISO 4–5 5 4 5 5–6 6 2–3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good–very good Unaffected Unaffected		Good–very good — —
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Paper: beater dyeing For dyeing casein-formaldehyde plastics, Cellophane and colouring soap		Paper

73	74	75	C.I. Direct Blue
	Trisazo 34146	Trisazo 34220	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Dull Blue	Dull Blue	HUE: Daylight
Normal — — 65-90 Good 8	Normal B Good 80 — —	Normal B Fairly good 100 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained	— Silk and wool dyed lighter than cotton Acetate unstained	Silk: Glauber's salt and acetic acid Silk and wool dyed lighter than cotton. Acetate and nylon slightly stained	OTHER FIBRES Dyeing Staining
	Cellulose and silk: urea process with disodium orthophosphate	Cellulose: direct	PRINTING
ISO Direct 4 5 3 3-4 5 5-6 3 — 2-3 —	AATCC ISO 5 4 4 4 4 4 — 4-5 4 5 5 5-6 (I) 4 2-3 — — — 3 — —	AATCC ISO 4 4-5 3-4 4 3 4 4 4-5 4-5 5 5 5-6 (I) 2 2-3 — — 3 3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —	Very good Practically unaffected Practically unaffected	Very good Greener, duller Greener, duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper, Cellophane Leather: see Leather Dyes section	Leather: on chrome tannage Paper: beater dyeing Plastics: occasionally	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 75:1—79

C.I. Direct Blue	75:1	76	76:1
CHEMICAL CLASS	Trisazo	Disazo (Cu complex)	Disazo (metal complex)
C.I. CONSTITUTION NUMBER		24411	
HUE: Daylight	Dull Blue	Greenish Blue	Greenish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Blue 75, but similar in properties and usage	Normal B — — —	Slightly different chemically from C.I. Direct Blue 76, but similar in properties and usage
OTHER FIBRES Dyeing Staining		Silk and wool dyed much lighter than cotton. Acetate unstained, nylon stained	
PRINTING		Cellulose: direct prints and for dischargeable grounds	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		AATCC ISO 4 5 4 4-5 4 4-5 4 4-5 5-6 5 5-6 5-6 (I) 3 3 — — 2 3 — —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: good—very good Alkaline: good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE		Urea-formaldehyde finishes improve the light fastness somewhat Leather: see Leather Dyes section Paper: beater dyeing See also C.I. Direct Blue 219	

77	78	79	C.I. Direct Blue
	Trisazo 34200	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue (Direct)	Blue	Greenish Blue (Direct)	HUE: Daylight
Normal B Fairly good 60-80 — 4	Normal B Very good 90-100 — —	Normal A — 60 — 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool slightly stained Acetate unstained	Silk dyed much lighter than cotton, wool lighter Acetate and nylon unstained	Silk slightly stained, wool heavily stained Acetate unstained	OTHER FIBRES Dyeing Staining
Viscose: urea process	Cellulose: urea process with disodium orthophosphate Nylon: with solubilising agents and ammonium tartrate for fixing	Cellulose: urea process with disodium orthophos- phate	PRINTING
AATCC Direct 4 4 3 5-6 5-6 6 (II) 4 — 3-4 —	ISO Direct 4 4 4 4-5 5-6 6-7 7 4 — 4 —	ISO (4) 4 4 4-5 5 6 6 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: fairly good Aftertreated (4): good Slightly affected Slightly affected	Good-very good Practically unaffected Practically unaffected	Direct: fairly good Aftertreated (4): alk. with anthraquinone, good-very good Slightly affected Slightly affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section	Anticrease finishes have slight ad- verse effect on light fastness Leather: see Leather Dyes section Paper: beater dyeing Biological stain Cellophane	Anodised aluminium Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 80—84

C.I. Direct Blue	80	80:1	81
CHEMICAL CLASS	Disazo (metallised)	Disazo (metallised)	Trisazo
C.I. CONSTITUTION NUMBER			34215
HUE: Daylight	Blue	Reddish Blue	Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 100 Good 3, 4, 5	Slightly different chemically from C.I. Direct Blue 80, but similar in properties and usage	Normal B — 100 — 4
OTHER FIBRES Dyeing Staining	— Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained		Silk: on unweighted and weighted silk Silk dyed much lighter than cotton, wool lighter. Acetate and nylon stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 1 3 2 — 5* — (II) 2 — *on rayon: 7	ISO Direct 1 4 4 5 6 6-7 2 — 2 — 3 — 4-5 —	AATCC Direct 3 4 3-4 — 5 — (I) 4 4 — 3 — 4-5 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fairly good Slightly redder Slightly duller		Direct: good—very good Aftertreated (4): good Unaffected Trace greener Sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Covers irregular-dyeing viscose and only slightly affected by crease-resist finishes Leather: see Leather Dyes section		Paper

82	83	84	C.I. Direct Blue
Trisazo 34130	Trisazo 34230	Disazo 23160	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Greenish Blue	Blue	HUE: Daylight
Normal — — — Very good —	Normal — — 80-100 Fairly good —	Normal — — 80 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: unweighted and weighted silk Silk dyed much lighter than cotton, wool lighter Acetate stained	Unweighted and weighted silk: light fastness on weighted silk considerably inferior Silk dyed much lighter than cotton, wool lighter Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 4-5 3 4-5 5 5 1-2 — 1-2 —	ISO 5 5 3 4-5 5 5 2 — 2 —	ISO 3 4 4 6-7 6-7 7 2 — 1-2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Very good — —	Good-very good Unaffected Unaffected	Good Slightly greener Slightly greener	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper	Paper Aqueous inks and water colours	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 85—89

C.I. Direct Blue	85	86	86:1
CHEMICAL CLASS		Phthalocyanine	Phthalocyanine
C.I. CONSTITUTION NUMBER		74180	
HUE: Daylight	Dull Blue→Navy	Bright Greenish Blue (Direct)	Greenish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — —	Normal B Poor—fair — — 4	Slightly different chemically from C.I. Direct Blue 86, but similar in properties and usage
OTHER FIBRES Dyeing Staining			
	Silk and wool dyed much lighter than cotton. Acetate and nylon unstained	Silk and wool dyed slightly lighter than cotton. Acetate and nylon slightly stained	
PRINTING		Cellulose: urea process with disodium orthophosphate Wool, silk and nylon: suitable	
FASTNESS PROPERTIES Method	AATCC ISO	AATCC ISO ISO Direct Direct (4)	
Acid (organic)	—	4-5	1
Alkali	—	4	4
Hot pressing	4	4	5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	5	4
normal	6	6	4-5
2 × normal	—	6-7	5
Washing — alteration	(I) 3-4	3	(I) 1
staining	—	—	2
Water — alteration	—	2-3	1
staining	—	—	2
OTHER PROPERTIES Dischargeability	Very good	Direct: neutral, fairly good; alkaline, fair Aftertreated (4): alk. with anthraquinone, fair	
Effect of metals — Copper Iron	Unaffected Somewhat affected	Noticeably weaker Much greener	
NOTES AND NON-TEXTILE USAGE	Paper	Heavy metal salts have pigment usage, see C.I. Pigment Blue 17 Leather: see Leather Dyes section Paper: beater dyeing and surface colouring. Fastness properties: NaOH 1%, good; H ₂ SO ₄ 1%, good; light, good; water, fair Occasional use for writing inks	

87	88	89	C.I. Direct Blue
Phthalocyanine 74200	Trisazo	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Greenish Blue	Bright Greenish Blue	Bright Blue	HUE: Daylight
	Normal — Good — Good 3, 6	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	Wool heavily stained Acetate and nylon unstained	OTHER FIBRES Dyeing Staining
			PRINTING
	AATCC 3 3 3 — 5 — (I) 2 — 2* — *improved by aftertreatments 3 and 6	AATCC 4 4 4 — 6 — (I) 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: fairly good Slightly redder Slightly redder	Neutral: fairly good—good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: beater dyeing and surface colouring, particularly crêpe papers	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 90—95

C.I. Direct Blue	90	91	92			
CHEMICAL CLASS						
C.I. CONSTITUTION NUMBER						
HUE: Daylight	Greenish Blue (Direct)	Bright Blue	Greenish Blue			
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — 4	Normal* — — — Good—very good —	Normal B — 60–100 — —			
OTHER FIBRES Dyeing Staining		Silk and wool dyed much lighter than cotton Acetate unstained	Silk and wool dyed much lighter than cotton. Acetate and nylon unstained			
PRINTING	Viscose: urea process	Cellulose: urea process with disodium orthophosphate				
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½–½ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 4 4 5 5–6 6 6–7 (III) 2–3 — —	AATCC (4) 5 4 5 — 5 — (III) 4–5 — —	ISO Direct (4) 5 4 5 6 6 6 4–5 — —	ISO 3–4 4–5 4 4–5 6 6 3 — 2–3 —	AATCC — — 4 — 6 — (I) 4 — —	ISO 4–5 3–4 3–4 4–5 6 6 3–4 — 2–3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: neutral, fairly good; alk., good Aftertreated (4): alk. with anthraquinone, good — —	Neutral: very good Alkaline: good—very good — —	Very good Unaffected Somewhat affected			
NOTES AND NON-TEXTILE USAGE		Paper *salt and temp. control	Paper Leather: see Leather Dyes section			

93	94	95	C.I. Direct Blue
Disazo 22810	Disazo	Disazo 23150	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Blue	Reddish Navy	Bright Blue	HUE: Daylight
Normal — — 100 Poor —	Normal B — Good 4, 5	Normal — — 60 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk dyed much lighter than cotton, wool lighter Acetate unstained	Silk dyed heavier and redder than cotton. Wool heavily stained, Acetate and nylon slightly stained		OTHER FIBRES Dyeing Staining
	Cellulose: direct prints by urea process		PRINTING
ISO 2 3-4 3 5-6 6 6-7 3 — 4 —	ISO Direct 5 3 5 6-7 7 7 3 — 4-5 — ISO (4) — — — 7-8 — — 4-5 4 —	ISO on viscose 4 3-4 4 5 6 6-7 2-3 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: good—very good Unaffected Unaffected Very sensitive to hard water	Fair — —	Good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	May be dyed at high temperatures with 0.5 g/l of aluminium sulphate in the bath Hardly affected by crease-resist finishes		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 96—100

C.I. Direct Blue	96	97	98
CHEMICAL CLASS	Disazo	Oxazine	Disazo
C.I. CONSTITUTION NUMBER	21620		23155
HUE: Daylight	Greenish Blue	Blue	Blue (Direct)
DYEING: CELLULOSE			
Dyeing method	Normal	Neutral or slightly acid	Normal
S.D.C. Classification	—	—	—
Exhaustion	—	—	Good
Temp. of maximum affinity °C	—	—	100
Levelling	—	Fairly good	Fair
Suitable aftertreatment	—	—	4
OTHER FIBRES			
Dyeing		Silk: Glauber's salt, neutral	
Staining		Silk dyed heavier than cotton, wool redder, but only slightly stained at 40°C. Acetate unstained, nylon heavily stained	Silk and wool dyed slightly lighter than cotton. Acetate and nylon slightly stained
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	ISO	AATCC Direct AATCC (4) ISO Direct
Acid (organic)	4	4	3 3 4
Alkali	4	4	4 4 4
Hot pressing	3	3-4	3 5 3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	6	— — 5-6
normal	5	6-7	6 5-6 6
2 × normal	—	7	— — 6-7
Washing — alteration	2	3-4	(I) 1-2 (I) 3 2-3
staining	—	—	— — —
Water — alteration	2-3	2-3	2 5 2-3
staining	—	—	— — —
OTHER PROPERTIES			
Dischargeability		Not dischargeable	Neutral: fair—fairly good Alkaline: fairly good
Effect of metals — Copper Iron		Trace greener and duller Slightly greener and duller	Slightly greener Unaffected
NOTES AND NON-TEXTILE USAGE		Covers irregular-dyeing viscose and suitable for yarn delustrated with titanium dioxide	Leather: see Leather Dyes section Paper: beater dyeing and occasionally for coating

98:1	99	100	C.I. Direct Blue
Disazo		Azo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue (Direct)	Blue (Direct)	Blue	HUE: Daylight
Slightly different chemically from C.I. Direct Blue 98, but similar in properties and usage	Normal — Good — Fair 4	Normal — Good — Fair —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon slightly to heavily stained	Silk and wool dyed lighter than cotton, dyed cold practically unstained. Acetate unstained, nylon stained	OTHER FIBRES Dyeing Staining
			PRINTING
	AATCC Direct 5 2-3 4-5 — 7 — (I) 1-2 2 —	AATCC (4) 4 3 5 — 6-7 — (I) 2-3 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
	Direct: neutral, fairly good—good Unaffected Unaffected	— Unaffected Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper: occasional use in beater dyeing	Leather: on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 101—106

C.I. Direct Blue	101	102	103
CHEMICAL CLASS	Disazo		
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Blue (Direct)		Bright Reddish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fair — Good 6	This C.I. Generic Name is no longer in use. Dyes formerly listed now appear under C.I. Direct Blue 80	Normal — — — Very good —
OTHER FIBRES Dyeing Staining	 Silk and wool dyed much lighter than cotton. Acetate and nylon unstained		 Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 5 3 — 7 — (I) 3* 1 — *improved by aftertreatment 6		ISO 2 3-4 3 5 5-6 5-6 3 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Unaffected Greener and duller		Very good — —
NOTES AND NON-TEXTILE USAGE			

104	105	106	C.I. Direct Blue
Dioxazine	Disazo (metallised)	Oxazine 51300	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Blue	Bright Blue	HUE: Daylight
Normal — Good — Good —	Normal — Good — Good —	Normal (neutral) B — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool heavily stained. Acetate slightly stained, nylon heavily stained	— Silk and wool heavily stained. Acetate and nylon slightly stained	Nylon Silk: Glauber's salt and acetic acid Silk and wool dyed equal to cot- ton, wool redder Acetate stained, nylon dyed	OTHER FIBRES Dyeing Staining
		Cellulose: urea process. Used as an illuminating colour in for- maldehyde-sulphoxylate dis- charge prints	PRINTING
AATCC 5 1 3 — 6 — (I) 3 1 —	AATCC 5 3 5 — 4-5 — (I) 2 1 —	ISO Cotton 4 4 3-4 6 6-7 7 3-4 — 2-3 — ISO Nylon — — — 3 4 4 4 5 (nylon) — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: poor-fair Unaffected Duller	Neutral: good Duller Much greener and duller	Not dischargeable Slightly greener and duller Slightly greener and duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 107—112

C.I. Direct Blue	107	108	109
CHEMICAL CLASS	Oxazine	Oxazine	Oxazine
C.I. CONSTITUTION NUMBER	51315	51320	51310
HUE: Daylight	Bright Reddish Blue	Bright Blue	Greenish Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — — — —	Normal — — — Good —	Normal — — — Good —
OTHER FIBRES Dyeing Staining	— Silk stained, wool heavily stained (redder) Acetate unstained	Silk Silk dyed slightly heavier, wool heavier than cotton Acetate unstained	Silk: Glauber's salt and acetic acid Nylon Silk dyed heavier than cotton, wool dyed lighter than cotton Acetate unstained
PRINTING	Cellulose and wool: urea process with disodium orthophosphate	Cellulose: direct Also as an illuminating colour in discharge prints	Cellulose: direct Stable to formaldehyde-sulphoxylate discharges
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO — 4 4 6 6-7 7 3-4 — 3-4 —	ISO 2 4 3 6 6-7 6-7 2 — 2 —	ISO 4 3-4 2-3 6 6-7 7 2 — 2-3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Not dischargeable Unaffected Duller	Not dischargeable —	Not dischargeable Slightly greener and duller Slightly greener and duller
NOTES AND NON-TEXTILE USAGE	Used as an illuminating colour in formaldehyde sulphoxylate discharge prints		Leather: see Leather Dyes section

110	111	112	C.I. Direct Blue
Trisazo 34125	Disazo 26680	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Blue→Navy	Dull Greenish Blue	Bright Blue	HUE: Daylight
Normal B — 100 — 2	Normal — — 100 Very good —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed equal to cotton Acetate stained	— Acetate slightly stained	— Wool slightly stained Acetate and nylon unstained	OTHER FIBRES Dyeing Staining
		Cellulose: direct	PRINTING
ISO 4-5 4-5 4 4-5 5 5-6 2-3 — 3 —	ISO 5 4 4-5 4-5 5 5-6 3-4 — 3-4 —	AATCC 3 4 5 — 6 — (I) 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —	Very good — —	Neutral: very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather Paper	Leather Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 113—118

C.I. Direct Blue	113	114	115							
CHEMICAL CLASS	Disazo (metallised)									
C.I. CONSTITUTION NUMBER										
HUE: Daylight	Reddish Blue	Blue (Direct)	Blue (Direct)							
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Poor —	Normal B — 80–100 — 4	Normal C — 60–100 — 4							
OTHER FIBRES Dyeing	—	—	—							
Staining	Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	Acetate stained	Wool and acetate unstained							
PRINTING			Viscose: urea process							
FASTNESS PROPERTIES Method	AATCC Cotton	AATCC Viscose	AATCC Direct	AATCC (4)	ISO Direct	ISO (4)	AATCC Direct	AATCC (4)	ISO Direct	ISO (4)
Acid (organic)	4	—	5	—	5	5	5	—	5	5
Alkali	5	—	4–5	—	4	5	5	—	5	5
Hot pressing	5	—	5	5	4–5	5	4–5	4–5	3–4	4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	—	5–6	—	6–7	—	5	—	6	5
normal	6	7–8	6	4–5	7	5–6	5–6	4	6–7	6
2 × normal	—	—	6–7	—	7	—	6	—	7	6
Washing — alteration	(I) 1–2	(I) 3	(II) 3–4	(II) 4–5	4	5	(III) 2–3	(III) 4–5	4–5	4–5
staining	—	—	—	—	—	—	—	—	—	—
Water — alteration	2	—	3–4	5	4	5	4	4–5	4	5
staining	—	—	—	—	—	—	—	—	—	—
OTHER PROPERTIES Dischargeability	Neutral: fairly good—good	Direct: fair Aftertreated: alk. with anthraquinone, very good	Direct: fair Aftertreated: alk. with anthraquinone, very good				Direct: fair Aftertreated: alk. with anthraquinone, good			
Effect of metals — Copper Iron	Unaffected Unaffected	Practically unaffected Practically unaffected	Practically unaffected Practically unaffected				Slightly affected Slightly affected			
NOTES AND NON-TEXTILE USAGE	Paper	Suitable for goods to be given urea-formaldehyde finishes								

116	117	118	C.I. Direct Blue
Disazo 27980		Disazo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Blue	Blue	Blue	HUE: Daylight
Normal A Good 60 — —	Normal B — 80–100 — —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool dyed equal to cotton, silk stained and redder Acetate slightly stained	— Acetate unstained	— Silk and wool heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate Silk and wool: suitable			PRINTING
ISO 3 4–5 2–3 3–4 4 4 1–2 — 2 —	ISO 5 4 4–5 6 6–7 7 4 — 4 —	AATCC 5 1 5 — 5 — (I) 1 — 1 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good Slightly affected —	Fair — —	Neutral: very good Unaffected Much duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Suitable for goods to be given urea-formaldehyde finishes	Light fastness unaffected by crease-resist finishes Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 119—121

C.I. Direct Blue	119	120	120:1
CHEMICAL CLASS		Trisazo	Trisazo
C.I. CONSTITUTION NUMBER		34085	34090
HUE: Daylight	Blue	Blue (Direct) Navy (8)	Blue (Direct) Navy (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 100 — —	Normal B — — — 8	Similar in properties and usage to C.I. Direct Blue 120
OTHER FIBRES Dyeing Staining	— Acetate unstained	Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon heavily stained	
PRINTING		Cellulose: for dischargeable grounds	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 4-5 4-5 5-6 6-7 7 4 — 4 —	AATCC ISO (8) (8) 4 5 3-4 4-5 4-5 4 4-5 4 5 4-5 5-6 5 (II) 4 3-4 — — 4-5 4-5 — —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair Alkaline: fairly good — —	Very good Practically unaffected Practically unaffected	
NOTES AND NON-TEXTILE USAGE	Suitable for goods to be given a urea-formadehyde finish. Washing fastness improved	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	

120:2	120:3	121	C.I. Direct Blue
Trisazo 34085 or 34090	Trisazo	Trisazo 34095	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue (Direct) Navy (8)	Blue (Direct) Navy (8)	Reddish Blue (8)	HUE: Daylight
Similar in properties and usage to C.I. Direct Blue 120, but the exact constitution not determined	Slightly different chemically from C.I. Direct Blue 120, but similar in properties and usage	Normal — — 80 Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		— Silk and wool dyed lighter than cotton Acetate unstained	OTHER FIBRES Dyeing Staining
		Cellulose: for dischargeable grounds	PRINTING
		ISO (8) 5 5 4 4 4-5 5 4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
		Very good Unaffected Little weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 122—127

C.I. Direct Blue	122	123	124
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	27115	26705	27050
HUE: Daylight	Blue (8)	Dull Blue→Navy (8)	Dull Blue→Greenish Blue (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 80 Very good 8	Normal — Good—very good 60 Fairly good 8	Normal — Fair 80 Good 8
OTHER FIBRES Dyeing Staining	— Silk dyed equal depth to cotton, wool lighter Acetate unstained	— Silk and wool dyed lighter than cotton Acetate unstained	
PRINTING	Cellulose: for dischargeable grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (8) 4 4–5 3–4 3 4 4 4 — 4–5 —	ISO (8) 5 5 4 3 3 3 3–4 — 3–4 —	ISO (8) 4 4–5 4–5 2 2–3 3 3–4 — 3–4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Trace redder Practically unaffected Somewhat sensitive to hard water	Very good Unaffected Little duller Somewhat sensitive to hard water	Neutral: good—very good Alkaline: very good — —
NOTES AND NON-TEXTILE USAGE			

125	126	127	C.I. Direct Blue
	Trisazo 34010	Trisazo 34080	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Blue (8)	Reddish Navy (8) Black (9)	Greenish Blue (8) Reddish Navy (9)	HUE: Daylight
Normal — — — Good 3, 8	Normal C Fairly good—good 80 — 8, 9	Normal — Fair 100 Fair 8, 9	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: acetic acid Silk and wool dyed much lighter than cotton. Acetate stained, nylon heavily stained	Silk: Glauber's salt and acetic acid Silk and wool dyed lighter than cotton. Acetate and nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (3) 3 2 3 — 4-5 — 3-4 — 2 —	ISO (8) 3 2 3 — 3 — 3-4 — 2 —	AATCC (8) 4 4 4 4 5 5-6 (II) 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
	Cellulose (8) (9): very good Silk (8): neutral, fair—fairly good Unaffected Slightly duller and weaker	Very good Unaffected Slightly duller Somewhat sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Fastness on silk: light, moderate; washing, very good Leather: on chrome tannage, developed	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 128—132

C.I. Direct Blue	128	129	130
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	27140	27095	27110
HUE: Daylight	Blue (8)	Dull Blue (8)	Blue (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 8	Normal — Fairly good 80 Good—very good 8	Normal A Good—very good 80 — 8
OTHER FIBRES Dyeing Staining	— Acetate slightly stained	— Silk and wool dyed lighter than cotton Acetate stained	Silk: Glauber's salt and acetic acid Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained
PRINTING		Cellulose: direct and for dischargeable grounds	Cellulose: for dischargeable grounds
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 4 4–5 4–5 1 2 2–3 3–4 — 3–4 —	ISO (8) 4 4 4 2–3 3 3–4 3–4 — 4–5 —	AATCC (8) 5 5 5 — 4 — (II) 3–4 5 — ISO (8) 4 4 4 2 3 4 4 — 4–5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Good—very good Unaffected Unaffected	Very good Unaffected Slightly greener
NOTES AND NON-TEXTILE USAGE			Leather: occasional use on chrome tannage

130:1	131	132	C.I. Direct Blue	
Disazo	Polyazo 35085	Disazo 27725	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Blue (8)	Navy (8)	Greenish Navy (8) Greenish Black (9)	HUE: Daylight	
Slightly different chemically from C.I. Direct Blue 130, but similar in properties and usage	Normal — — — Fairly good —	Normal — Fair 80-100 Fairly good 8, 9	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
	— Silk, wool and acetate slightly stained	— Silk and wool dyed lighter than cotton. Acetate and nylon heavily stained	OTHER FIBRES Dyeing Staining	
			PRINTING	
	ISO Direct 4 4 3-4 — 4 — 2-3 — 2 —	AATCC (8) 4 4-5 4-5 — 4-5 5-6 (II) 4 — 4-5 —	ISO (9) 5 5 5 4-5 3-4 3 4-5 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½-½ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		Neutral (8) (9): good Alkaline (8) (9): fairly good Unaffected Slightly duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
		Leather: on chrome tannage	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Blue 133—137

C.I. Direct Blue	133	134	135
CHEMICAL CLASS	Trisazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER	34005	*	34290
HUE: Daylight	Dull Reddish Violet→Dull Reddish Blue (8)	Dull Reddish Blue (8)	Reddish Blue→Reddish Navy (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Fair 100 — 8	Normal A — — — 8	Normal B — 80 — 8
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk dyed slightly lighter than cotton. Wool and nylon heavily stained Acetate stained		— Silk dyed much lighter than cotton, wool lighter Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 5 5 — 5 — (II) 3 — 5 — —	ISO (8) 3 4 3 2 3 4 4 — 4 — —	ISO (8) 5 5 4-5 4 4-5 5 4 — 4 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good Unaffected Unaffected	Fairly good — —	Neutral: very good Alkaline: fairly good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage Paper: occasional use for beater dyeing	*Similar in constitution to C.I. Direct Blue 133, C.I. 34005	

135:1	136	137	C.I. Direct Blue
Trisazo	Disazo 24065		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Blue→Reddish Navy (8)	Blue (8)	Greenish Blue (8)	HUE: Daylight
Slightly different chemically from C.I. Direct Blue 135, but similar in usage. Somewhat superior in levelling and dischargeability. Does not stain acetate but somewhat inferior in fastness to alkali	Normal — Fair — Fair 8	Normal — — — Good—very good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: Glauber's salt and acetic acid Silk, wool, acetate and nylon heavily stained	— Silk dyed much lighter than cotton. Wool almost unstained at 80°C. Acetate unstained	OTHER FIBRES Dyeing Staining
			PRINTING
	AATCC (8) 5 5 5 — 2 — (II) 3 — 5 — ISO (8) 4 5 5 1 2 2 4 — 4 —	ISO (8) 4-5 4-5 4 5 6 6-7 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: very good Alkaline: good—very good Unaffected Unaffected	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 138—143

C.I. Direct Blue	138	139	140
CHEMICAL CLASS	Disazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	26650		27640
HUE: Daylight	Blue (8)	Navy (8)	Reddish Blue (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 60 — 8	Normal B — — — 8	Normal — — — — 8
OTHER FIBRES Dyeing Staining	Silk: unweighted, formic or acetic acid; weighted, neutral Silk and wool dyed lighter than cotton. Acetate slightly stained, nylon heavily stained	 Silk slightly stained, wool heavily stained, acetate unstained	
PRINTING	Cellulose: for dischargeable grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 5 5 — 4 — (II) 2–3 — 5 — ISO (8) 4 5 5 3 4 4 3–4 — 4 —	ISO 3 4 5 3–4 — 4–5 —	ISO (8) 5 5 4–5 3 3 3 3 — 4–5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Unaffected Slightly duller	Very good — —	Very good — —
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage		

141	142	143	C.I. Direct Blue
		Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Navy (8)	Navy (Direct) Greenish Navy (8)	Dull Blue (8)	HUE: Daylight
Normal B — 40-80 — 8	Normal — — — Very good 8	Normal — Good — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained by low dye concentrations	— Silk dyed lighter than cotton Wool almost unstained at 80°C Acetate unstained	— Silk and wool much lighter than cotton. Acetate slightly stained. Nylon heavily stained	OTHER FIBRES Dyeing Staining
		Cellulose: for dischargeable grounds	PRINTING
ISO (8) 2 4 3-4 4 4 5 4-5 — 4 —	ISO Direct 3-4 4 4 4-5 5 6 1-2 — 3 —	ISO (8) 5 5 3-4 4 4-5 5 5 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good Slightly affected Considerably affected	Neutral: very good Alkaline: good Slightly affected Considerably affected	Neutral: very good Much weaker Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: occasional use on chrome tannage for shading	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 144—149

C.I. Direct Blue	144	145	146
CHEMICAL CLASS	Trisazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER		27895	
HUE: Daylight	Dull Blue (8)	Blue (8)	Blue (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good 8	Normal — — — — 8	Normal — Good — Good 8
OTHER FIBRES Dyeing Staining	— Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained		— Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained
PRINTING	Cellulose: for dischargeable grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 5 3 4 4-5 4-5 5 (II) 4 — 4-5 —	ISO (8) 5 5 3 — 4 — 3 — 4 —	AATCC (8) 5 2-3 4 3 3 4 (II) 4 — 4-5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good—very good Much duller and weaker Much duller	Very good — —	Neutral: very good Appreciably greener Grey
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage		Leather: occasional use on chrome tannage

147	148	149	C.I. Direct Blue
Azo	Trisazo 34135	Disazo 28350	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Navy (8)	Dull Blue (3)	Greenish Blue (3)	HUE: Daylight
Normal — Good — Good 6, 8	Normal C — 80 — 3	Normal — — 80 — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon heavily stained	— Silk dyed much lighter Wool heavily stained (grey) Acetate stained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 5 5 5 — 4-5 — (II) 5 3 —	AATCC (3) 1 4 5 — 5-6 — (III) 3-4 5 —	ISO (3) 3 3 5 5-6 6 6-7 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Unaffected Unaffected	Neutral: fairly good Alkaline: good Unaffected Unaffected	Neutral: fairly good—good Alkaline (with anthraquinone): good Trace redder Trace greener and duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 150—155

C.I. Direct Blue	150	151	152
CHEMICAL CLASS	Polyazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	35110	24175*	24360
HUE: Daylight	Navy Blue (3)	Reddish Blue (3)	Dull Reddish Blue
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	C	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	100	100	—
Levelling	—	—	—
Suitable aftertreatment	3	3, 6, 7	3
OTHER FIBRES			
Dyeing		—	
Staining		Silk and wool dyed lighter than cotton	
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	AATCC AATCC ISO ISO	AATCC AATCC
	(3)	Direct (3) Direct (3)	Direct (3)
Acid (organic)	3	3-4 5 4-5 4-5	5 3
Alkali	4	4 4 4-5 4-5	4 3-4
Hot pressing	4	4 5 3 4-5	— —
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	6	— — 1-2 5	— —
normal	6-7	2 5-6 1-2 5-6	— —
2× normal	7	— — 2 6	— —
Washing — alteration	4	(I) 2 (I) 3 2 4	3 2-3
staining	—	— — — —	— —
Water — alteration	4	3 3-4 2-3 4	2 3
staining	—	— — — —	— —
		Note: aftertreatments 6 and 7 give some improvement in washing and water fastness	
OTHER PROPERTIES			
Dischargeability	Neutral: fairly good Alkaline (with anthraquinone): fairly good	Direct: good—very good Aftertreated (3): alkaline, with anthraquinone, good	
Effect of metals — Copper Iron	Unaffected Somewhat greener and duller Somewhat sensitive to hard water	Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE		*The dyes listed under this C.I. Generic Name vary in constitution due to the use of mixed coupling components and are collectively related to C.I. 24175 Leather: occasional use on chrome and vegetable tannages Paper: occasional use for beater dyeing	

153	154	155	C.I. Direct Blue
Disazo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Reddish Blue (Direct) (3) slightly redder	Reddish Blue (Direct) (3) greener and duller	HUE: Daylight
Normal C — — — 3	Normal C — — — 3	Normal C — 60–100 — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed lighter than cotton, wool equal. Acetate heavily stained	— Silk dyed lighter and much redder than cotton. Wool heavily stained, redder. Acetate stained	— Acetate stained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process	PRINTING
ISO (3) 4–5 5 4 4–5 5 6–7 4 — 4 —	ISO Direct (3) 4–5 2–3 3 1 1–2 2 4 — 4 —	ISO Direct (3) 4–5 4 4–5 1 2 3 3–4 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor — —	Direct: good Aftertreated: fairly good Unaffected Somewhat affected	Direct: neutral, very good; alkaline, good Aftertreated (3): neutral and alkaline, fair Unaffected Slightly affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 156—160

C.I. Direct Blue	156	157	158
CHEMICAL CLASS	Disazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER		31680	24555
HUE: Daylight	Reddish Blue (Direct) Navy (3)	Dull Blue (7)	Dull Blue (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — 3, 4	Normal — — 100 Fairly good 7	Normal C Good 80 — 3, 4
OTHER FIBRES Dyeing Staining	— Silk and wool dyed very much lighter than cotton Acetate slightly stained		— Silk and wool dyed equal to cotton. Acetate and nylon slightly stained
PRINTING	Cellulose: urea process with disodium orthophosphate Steaming may be followed by aftertreatments 3 or 4		Cellulose: direct and discharge prints
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (3) 5 3-4 4 — 6-7 — (III) 4-5 5 —	ISO Direct (3) 5 4 3-4 — — — 4 4 5	AATCC Direct (3) 3-4 5 3-4 — 2-3 — (I) 1-2 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and aftertreated (3): neutral, good; alkaline, very good Aftertreated (4): alkaline, with anthraquinone, good-very good — —	Neutral: good-very good Alkaline: good Trace brighter Much greener Somewhat sensitive to hard water	Aftertreated (3): neutral, fairly good-good; alkaline, with anthraquinone, good-very good Aftertreated (4): alkaline, with anthraquinone, good Unaffected Trace greener and duller
NOTES AND NON-TEXTILE USAGE			Paper Leather

158:1	159	160	C.I. Direct Blue
Disazo	Polyazo 35775	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Blue (3)	Dull Blue (3)	Reddish Navy (3) Navy (4)	HUE: Daylight
Slightly different chemically from C.I. Direct Blue 158, but similar in properties and usage	Normal B 3, 4 — — —	Normal B — — — 3, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk dyed lighter than cotton, wool much lighter Acetate stained	— Silk and wool dyed much lighter than cotton Acetate slightly stained	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent The prints are steamed and aftertreated with a copper salt	Cellulose: urea process with disodium orthophosphate and aftertreatment	PRINTING
	AATCC ISO (3) (3) 1 1 3 3 5 2 — 5 5-6 6 — 6-7 (III) 4-5 4-5 — 5 — —	ISO ISO (3) (4) 3 5 3 4 5 4 — — 6 6-7 6-7 — 4-5 4-5 — — 5 5 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: good Alkaline: very good — —	Aftertreated (4): alk. with anthraquinone, good—very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 161—165

C.I. Direct Blue	161	162	162:1
CHEMICAL CLASS		Polyazo	Polyazo
C.I. CONSTITUTION NUMBER		35770	
HUE: Daylight	Navy (3)	Dull Blue (3)	Dull Blue (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal* — — — Fairly good—good 3	Normal C — — — 3, 4	Slightly different chemically from C.I. Direct Blue 162, but similar in properties and usage
OTHER FIBRES Dyeing Staining	— Wool dyed lighter and redder than cotton Acetate stained	— Silk slightly stained at 80°C Wool heavily stained, acetate stained	
PRINTING	Cellulose: urea process	Cellulose: urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent. The prints are steamed and aftertreated with a copper salt	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC (3) — — 3-4 — 6-7 — (II) 5 — 5 —	ISO (3) 5 4 3-4 — 6 6-7 5 — 5 —	AATCC (3) 1 3 5 — 5-6 — (III) 4 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good — —	Neutral: good Alkaline: very good — —	
NOTES AND NON-TEXTILE USAGE	*Salt and temperature control		

163	164	165	C.I. Direct Blue	
Trisazo 33560	Disazo 24550	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Dull Reddish Blue (3)	Reddish Navy (3)	Bright Blue (3)	HUE: Daylight	
Normal C — — — 3, 4	Normal — — 100 — 3	Normal C — — — 3, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk slightly stained at 80°C Wool heavily stained Acetate stained		— Silk slightly stained at 80°C. Acetate unstained Unsuitable for wool-cellulose unions	OTHER FIBRES Dyeing Staining	
Cellulose: urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent The prints are steamed and after-treated with a copper salt			PRINTING	
AATCC (3) 1 3 4 — 5-6 — (III) 4 — 5 —	ISO (3) 1 3-4 3-4 4 6 6-7 7 4 — 4-5 —	AATCC (3) 2 4-5 5 — 5-6 — (III) 3 — 5 —	ISO (3) 2 4-5 3 5 6 6 4 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: very good — —	Neutral: good Alkaline: good-very good Somewhat bluer, weaker Unaffected	Neutral: fairly good Alkaline: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
			NOTES AND NON-TEXTILE USAGE	

C.I. Direct Blue 166—171

C.I. Direct Blue	166	167	168
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	23165	24560	24185
HUE: Daylight	Bright Blue (3)	Navy (3)	Blue (Direct) Redder with aftertreatment 3
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — 3, 4	Normal — — 100 — 3	Normal — — 80 Poor 3
OTHER FIBRES Dyeing Staining	— Silk slightly stained at 80°C Acetate unstained. Unsuitable for wool/cellulose unions	 	— Silk and wool dyed lighter than cotton Acetate stained
PRINTING	Cellulose: urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent The prints are steamed and after-treated	Cellulose: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (3) 2 4-5 5 — 5-6 — (III) 3 — 5 — ISO (3) 2 4-5 2 5 6-7 — 4 — 5 —	ISO (3) 3-4 4 4 6 6-7 7 4 — 4-5 —	ISO Direct (3) 3 4 3-4 3 3 1 4 2 5 3 6 2 3 2 4 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: good — —	Neutral: fairly good Alkaline: good Somewhat redder Unaffected	Good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE			

169	170	171	C.I. Direct Blue				
Disazo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER				
Blue (Direct) Greener with aftertreat- ment 3	Reddish Navy (3)	Navy (3 and 4)	HUE: Daylight				
Normal — Good — Fair 3	Normal — 100 Good—very good —	Normal C — — — 3, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment				
— Silk and wool dyed equal to cotton. Acetate and nylon heavily stained	— Acetate slightly stained	— Wool unstained	OTHER FIBRES Dyeing Staining				
			PRINTING				
AATCC Direct 5 5 3 — 2 — (II) 2 4 —	AATCC (3) 5 5 3 — 6 — (II) 3 5 —	ISO (3) — — — 5 6 6-7 4 5 —	AATCC Direct — — 3 — 2 — (II) 2-3 2 —	AATCC (3) — — 5 — 4-5 — (II) 3-4 5 —	AATCC (4) — — 5 — 4 — (II) 4 5 —	ISO (4) 3 4 4 — 6-7 — 4-5 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½-½ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: neutral, fairly good Aftertreated: not dis- chargeable Unaffected Slightly duller	Fair — —	Aftertreated (4): alkaline, with anthra- quinone, fairly good—good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron				
			NOTES AND NON-TEXTILE USAGE				

C.I. Direct Blue 172—177

C.I. Direct Blue	172	173	174
CHEMICAL CLASS	Azo		Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Navy (3 and 4)	Bright Reddish Blue (Direct) Duller with aftertreatment 3	Reddish Blue (3)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — 3, 4	Normal C — 60–80 — 3	Normal C — — — 3
OTHER FIBRES Dyeing Staining		— Acetate stained	— Silk and wool dyed much lighter than cotton Acetate heavily stained
PRINTING	Viscose: urea process	Cellulose: urea process	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (3) — — — — 6 — (III) 3 — — —	AATCC (4) 3 4–5 5 4–5 5 6 (III) 4–5 — 4–5 —	ISO (3) 3 3–4 4 — 7 — 4–5 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Aftertreated (3) and (4): alkaline, with anthraquinone, good–very good — —	Direct: neutral, very good; alkaline, good Aftertreated (3): neutral and alkaline, fair Unaffected Unaffected	Poor — —
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section	

175	176	177	C.I. Direct Blue	
Polyazo 35465	Polyazo 35460	Disazo 22625	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Navy (Direct)	Greenish Blue (Direct)	Bright Reddish Blue (Direct)	HUE: Daylight	
Normal — Fairly good — Good 6	Normal — Good — Good 6	Normal — — — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk and wool dyed much lighter than cotton. Acetate and nylon unstained	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining	
			PRINTING	
AATCC Direct 5 5 5 — 5 — (II) 3 5 —	AATCC Direct 3 5 3 — 3 — (II) 2 3 —	AATCC Direct 5 5 3 — 4 — (II) 2 2 —	AATCC (6) 5 5 5 — 5 — (II) 3 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Little redder, duller Slightly duller	Neutral: very good Duller Unaffected	Neutral: very good Little greener Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: occasional use on chrome tannage	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE	

C.I. Direct Blue 178—183

C.I. Direct Blue	178	179	180
CHEMICAL CLASS			Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Navy (6)	Navy (6)	Blue (6)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 80 — 6	Normal C — 60–80 — 6	Normal — Good — Good 6
OTHER FIBRES Dyeing Staining	— Acetate stained	— Acetate stained	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 5 4 3–4 — 3 — 2–3 — 4 — 4–5	ISO (6) 5 4 4 3 — 3 — 3 — 3–4 —	AATCC (6) 4 3 2 — 3 — (I) 5 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Fairly good Somewhat affected Somewhat affected	Neutral: fairly good–good Alkaline: fairly good Slightly affected Slightly affected	Neutral: very good — —
NOTES AND NON-TEXTILE USAGE			

181	182	183	C.I. Direct Blue
Disazo	Polyazo	Trisazo 31951	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Navy (Direct) Greenish Navy (3)	Reddish Navy (6)	Blue (8)	HUE: Daylight
Normal — Good — Good 2, 3	Normal — Fair — Fair 6	Normal — 80 — Very good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed much lighter than cotton. Acetate and nylon slightly stained	— Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC Direct 3 3 3 5 — (II) 4 4 —	AATCC (2) 5 5 3 5 — (II) 5 5 —	AATCC (3) 5 3 3 5 — (II) 4 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Unaffected Duller	Neutral: good—very good Unaffected Redder, weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 184—189

C.I. Direct Blue	184	185	186
CHEMICAL CLASS	Disazo	Disazo	Trisazo
C.I. CONSTITUTION NUMBER	29128	29130	34139
HUE: Daylight	Blue	Blue	Reddish Navy
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	—	—
Levelling	—	—	—
Suitable aftertreatment	—	—	—
OTHER FIBRES			
Dyeing			
Staining			
PRINTING			
FASTNESS PROPERTIES			
Method			
Acid (organic)			
Alkali			
Hot pressing			
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal			
normal			
2 × normal			
Washing — alteration			
staining			
Water — alteration			
staining			
OTHER PROPERTIES			
Dischargeability			
Effect of metals — Copper			
Iron			
NOTES AND NON-TEXTILE USAGE			

187	188	189	C.I. Direct Blue
	Disazo	Phthalocyanine	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
	Bright Blue Artificial light: duller	Bright Greenish Blue Artificial light: greener	HUE: Daylight
This C.I. Generic Name is discontinued	Normal B — Good —	Normal B Poor — Very good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: weakly acidic bath Silk dyed, wool heavily stained, acetate slightly stained	Silk: neutral or with acetic acid Silk and wool dyed. Acetate heavily stained, nylon and polyester stained	OTHER FIBRES Dyeing Staining
	Silk and wool: direct Viscose: urea process	Cellulose, silk and wool: direct prints	PRINTING
	ISO 4-5 5 3-4, 5 4-5 6 6-7 4 2 3-4 1	ISO Direct ISO (5) ISO (onsilk) ISO (on nylon) 3 — — — 5 — — — 3 — — — 4-5 — 5 4-5 6-7 — 6 5-6 — — — — 3 4 4-5 4-5 3 4 4-5 5 3 4-5 4-5 — 2 5 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Suitable for coloured dis- charges Redder Duller	Poor-fair Duller Duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Suitable for goods to be given anti-crease finishes, weaker and greener Leather: on chrome tan- nage	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 190—195

C.I. Direct Blue	190	191	192	
CHEMICAL CLASS	Oxazine	Disazo (metallised)	Disazo	
C.I. CONSTITUTION NUMBER	51305			
HUE: Daylight	Bright Blue	Greenish Blue Artificial light: practically un- changed	Reddish Blue Artificial light: redder	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — Affinity rises regularly with temp. Very good 5	Normal B Good 80–100 — —	Normal — — — — —	
OTHER FIBRES Dyeing Staining	— Silk and wool dyed Acetate slightly stained	— Silk and wool heavily stained Acetate, polyester and polyacrylic unstained, nylon slightly stained		
PRINTING		Cellulose: direct		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2–1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 4 3 — 5 5 5–6 2 — 2 —	ISO (5) — — — 5 5–6 6–7 — — — —	AATCC 5 5 4–5 4–5 5 6 3 — 4 —	ISO (on viscose) — — 4–5 — 6–7 — 3–4 2 4 2–3
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Not dischargeable Unaffected —	Good Slightly weaker Slightly weaker		
NOTES AND NON-TEXTILE USAGE		Effect of resin finishes: urea- formaldehyde: hue, slight effect; light, unaffected; melamine- formaldehyde: hue, slight effect; light, inferior; DMEU, hue, affected; light, inferior		

193	194	195	C.I. Direct Blue
Disazo	Azo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue Artificial light: redder	Reddish Blue	Blue Artificial light: redder	HUE: Daylight
Normal — — — — —	Normal — — — — 3	Normal — — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
ISO (on viscose) — — 4-5 — 7 — 4-5 2-3 4-5 2-3	ISO (on viscose) (3) — — 5 — 6-7 — (70°) 4-5 4-5 5 4-5	ISO (on viscose) (3) — — 5 — 6 — (70°) 4-5 3-4 5 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 196—201

C.I. Direct Blue	196	197	198
CHEMICAL CLASS	Azo	Disazo (metallised)	Disazo (metallised)
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Reddish Navy Artificial light: redder	Greenish Blue	Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — — 3	Normal — — — — —	Normal A Very good 100 Very good —
OTHER FIBRES Dyeing Staining			— Acetate and polyacrylic unstained Polyester slightly stained. Wool and nylon heavily stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (on viscose) (3) — — 5 — 6–7 — (70°) 4–5 3–4 5 4–5		AATCC 3 4 4 — 7 — 1–2 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			Neutral: good Alkaline: fairly good — —
NOTES AND NON-TEXTILE USAGE			Effect of anti-crease finishes: urea- formaldehyde: hue, unchanged, light, unchanged; melamine-for- maldehyde: hue, much greener, light, slightly inferior

199	200	201	C.I. Direct Blue
Phthalocyanine *	Azo (metallised)	Azo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Greenish Blue	Blue	Reddish Blue	HUE: Daylight
Normal A Fair 80-100 Good 5	Normal B Good — — —	Normal B Good — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate, triacetate and polyester slightly stained. Polyacrylic, nylon and wool heavily stained	Silk: neutral or acetic acid bath Acetate unstained, wool and nylon stained, silk heavily stained	Silk: neutral or with acetic acid Acetate unstained, wool and nylon stained, silk heavily stained	OTHER FIBRES Dyeing Staining
Silk and cellulose: direct	Cellulose: direct	Cellulose: direct	PRINTING
AATCC Direct 4 4 5 — 5-6 — 2-3 4 3 2	ISO Direct 2 4 3 4-5 6 6-7 3-4 4 3 2	ISO (5) — — — — — — 4 4 4-5 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: cotton, poor; viscose, good Alkaline: poor Unaffected Considerably affected	Neutral: good — —	Neutral: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Effect of anti-crease finishes: hue, slightly greener; light, slightly in- ferior Covers irregular quality viscose yarn *Constitution similar to C.I. 74180	Paper	Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 202—207

C.I. Direct Blue	202	203	204
CHEMICAL CLASS	Azo (metallised)	Azo (metallised)	Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bright Greenish Blue	Bright Reddish Blue	Blue
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good — — —	Normal A Good — — —	Normal — Very good 80 Good 3
OTHER FIBRES Dyeing Staining	Silk: with acetic acid Acetate unstained, nylon slightly stained, wool and silk heavily stained	Silk: with acetic acid Acetate slightly stained, wool and nylon stained, silk heavily stained	— Acetate and wool stained
PRINTING	Cellulose: direct	Cellulose: direct	Cellulose: urea process
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4-5 4 — 5-6 — 2-3 — 2-3 —	ISO 4-5 3 4 — 5-6 — 2 — 2 —	ISO 4-5 4 3 1-2 2 2-3 3 2 3 2
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good — —	Neutral: good — —	Neutral: 4 Alkaline: 4-5 Slightly affected Affected
NOTES AND NON-TEXTILE USAGE	Paper	Paper	

205	206	207	C.I. Direct Blue
	Disazo	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Blue Artificial light: redder	Blue	HUE: Daylight
This C.I. Generic Name is no longer in use	Normal C Very good 60 Good 5	Normal B Very good 60 Good 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Acetate, triacetate and polyester unstained, polyacrylic slightly stained, nylon heavily stained	— Acetate, triacetate and polyester unstained, nylon slightly stained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process	PRINTING
	<div> <div>ISO Direct</div> <div>4-5</div> <div>2-3</div> <div>4, 5</div> <div>4-5</div> <div>5-6</div> <div>6</div> <div>3-4</div> <div>—</div> <div>2-3</div> <div>—</div> </div> <div> <div>ISO (5)</div> <div>—</div> <div>—</div> <div>—</div> <div>4-5</div> <div>5-6</div> <div>6</div> <div>3-4</div> <div>—</div> <div>5</div> <div>—</div> </div>	<div> <div>ISO Direct</div> <div>4-5</div> <div>3-4</div> <div>4-5</div> <div>5-6</div> <div>6</div> <div>6-7</div> <div>4</div> <div>3</div> <div>3</div> <div>3</div> </div> <div> <div>ISO (4)</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4</div> <div>4-5</div> <div>5</div> <div>5</div> </div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Poor Unaffected Unaffected	Neutral (pale and medium depths): good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Covers irregular quality viscose Leather Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 208—213

C.I. Direct Blue	208	209	210
CHEMICAL CLASS		Disazo	Trisazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	—	Reddish Navy	Greenish Navy
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is no longer in use	Normal and padding C Very good 60–80 Good 4	Normal C Very good 60 Good 3, 4
OTHER FIBRES Dyeing Staining		Silk: with salt or acetic acid Acetate, triacetate and polyester unstained, nylon heavily stained	— Acetate and triacetate unstained, polyacrylic and polyester slightly stained, nylon stained
PRINTING		Cellulose: urea process	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 5 3 5 — 7 7–8 3 2 2–3 2	ISO (4) — — — — 7 — 2–3 4–5 2–3 4
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Not dischargeable Unaffected Unaffected	Alkaline: good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE		Leather Paper	Suitable for goods to be given an anti-crease finish

211	212	213	C.I. Direct Blue
Polyazo	Disazo (copper complex)	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Blue Artificial light: greener	Bright Blue Artificial light: duller	Reddish Blue	HUE: Daylight
Normal A Good 90-95 — 3	Normal A Very good 80-90 Very good 5	Normal B Good 90 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained, nylon stained	— Acetate and polyester unstained, nylon slightly stained, wool stained	Silk: neutral or weakly acid Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose: direct and discharge		PRINTING
ISO (3) 4 3-4 5 5 6 6 5 3-4 5 5	ISO Direct 5 2 5 6 6-7 7 3-4 2-3 4 1	ISO (5) — — — — — — 4 3 4-5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Alkaline, with anthraquinone: poor — —	Good — —	Neutral: poor-good Alkaline: good-very good Not affected Not affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome tannage with copper sulphate after-treatment	Leather: see Leather Dyes section		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 214—220

C.I. Direct Blue	214	215	216	217
CHEMICAL CLASS	Disazo	Disazo		
C.I. CONSTITUTION NUMBER		24415		
HUE: Daylight	Blue	Greenish Blue	—	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 90 Good —	Normal C Very good 100 Poor 3	This C.I. Generic Name is no longer in use. The dye originally listed may be found under C.I. Direct Blue 200	This C.I. Generic Name is no longer in use. The dye originally listed may be found under C.I. Direct Blue 202
OTHER FIBRES Dyeing Staining	Silk: neutral or weakly acid Acetate unstained	— Acetate heavily stained		
PRINTING				
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4–5 5 4–5 5 6 7 4 3 4–5 3	ISO (3) 3–4 3–4 3, 4, 3 5 6 6 3–4 2 4 2		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: poor–good Alkaline: good–very good Slightly duller Unaffected	Fairly good Unaffected Unaffected		
NOTES AND NON-TEXTILE USAGE				

218	219	220	C.I. Direct Blue
Disazo (metal complex) 24401	Disazo (metal complex)		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Blue Artificial light: greener	Greenish Blue	—	HUE: Daylight
Normal A Good 95 — —	Normal — — — — —	This C.I. Generic Name is no longer in use	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate and nylon unstained Silk and wool stained			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 4 4 4 5 6 6 (II) 3 — 3 —			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good Greener —			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Suitable for goods to be given a urea-formaldehyde finish	Fastness properties and usage are similar to those listed under C.I. Direct Blues 76 and 218		NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 221—226

C.I. Direct Blue	221	222	223
CHEMICAL CLASS	Azo	Azo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Blue	Blue	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A — — Very good 5	Normal B — — Good 5	This C.I. Generic Name is no longer in use
OTHER FIBRES Dyeing Staining	— Acetate unstained, silk stained, wool dyed Nylon heavily stained	— Silk and wool heavily stained, acetate stained Nylon slightly stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 5 4-5 4 3 4 4-5 4-5 3-4 4-5 3	ISO (5) — — 4 3-4 5-6 6-7 7 5 6-7 6-7 3 2-3 3-4 2	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: 5 Alkaline: 4-5 3 4-5	Neutral: 4-5 Alkaline: 5 Unaffected Slightly affected Slightly sensitive to hard water	
NOTES AND NON-TEXTILE USAGE			

224	225	226	C.I. Direct Blue
Disazo (metallised)	Disazo	Disazo 22800	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Blue Artificial light: greener	Bright Blue	Blue	HUE: Daylight
Normal A Good 100 — —	Normal A Good 50 Very good 5	Normal A Good 75 Very good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool heavily stained Acetate and nylon unstained	— Acetate unstained	— Acetate slightly stained	OTHER FIBRES Dyeing Staining
	Cellulose: direct and discharge		PRINTING
AATCC 4 4 4-5 5 5-6 6 3 — 2-3 —	ISO Direct (5) 4 2-3 3, 5, 2-3 4-5 5 5-6 1-2 3 1-2 1-2	ISO Direct (5) 4 3 4, 5, 3 4-5 5 5-6 1-2 3 2 1-2	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: 5 Much greener —	Neutral and alkaline: good Trace redder Practically unaffected	Neutral and alkaline: good Unaffected Slightly redder Sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Urea-formaldehyde resins improve the fastness to light. The hue becomes greener Paper: beater dyeing		Covers irregular-dyeing viscose	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 227—232

C.I. Direct Blue	227	228	229																																																
CHEMICAL CLASS		Trisazo	Disazo																																																
C.I. CONSTITUTION NUMBER																																																			
HUE: Daylight	—	Dull Greenish Blue	Dull Blue																																																
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is discontinued Dyes formerly listed under it now appear under C.I. Direct Blue 218	Normal B Poor 80 Poor 5	Normal A Poor 100 Good 5																																																
OTHER FIBRES Dyeing Staining		— Acetate unstained	— Silk, wool and nylon slightly stained, acetate unstained																																																
PRINTING		Cellulose: direct and discharge prints																																																	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½–½ normal normal 2 × normal Washing — alteration staining Water — alteration staining		<table><tr><td>ISO</td><td>ISO</td></tr><tr><td>Direct</td><td>(5)</td></tr><tr><td>5</td><td>—</td></tr><tr><td>4</td><td>—</td></tr><tr><td>3, 4, 4</td><td>5</td></tr><tr><td>6</td><td>—</td></tr><tr><td>6–7</td><td>6</td></tr><tr><td>7</td><td>—</td></tr><tr><td>2</td><td>3–4</td></tr><tr><td>4</td><td>4–5</td></tr><tr><td>3–4</td><td>5</td></tr><tr><td>2</td><td>5</td></tr></table>	ISO	ISO	Direct	(5)	5	—	4	—	3, 4, 4	5	6	—	6–7	6	7	—	2	3–4	4	4–5	3–4	5	2	5	<table><tr><td>ISO</td><td>ISO</td></tr><tr><td>Direct</td><td>(5)</td></tr><tr><td>4–5</td><td>—</td></tr><tr><td>3–4</td><td>—</td></tr><tr><td>4, 5, 3–4</td><td>5</td></tr><tr><td>5</td><td>—</td></tr><tr><td>6</td><td>6</td></tr><tr><td>6–7</td><td>—</td></tr><tr><td>2–3</td><td>4</td></tr><tr><td>3</td><td>3</td></tr><tr><td>3</td><td>5</td></tr><tr><td>2</td><td>5</td></tr></table>	ISO	ISO	Direct	(5)	4–5	—	3–4	—	4, 5, 3–4	5	5	—	6	6	6–7	—	2–3	4	3	3	3	5	2	5
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6–7	6																																																		
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2–3	4																																																		
3	3																																																		
3	5																																																		
2	5																																																		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: poor Alkaline: fairly good Very good under special conditions Practically unaffected Slightly weaker	Neutral: poor Alkaline: fairly good Unaffected Slightly weaker																																																
NOTES AND NON-TEXTILE USAGE																																																			

230	231	232	C.I. Direct Blue
Disazo 22455	Disazo 23830	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Bright Greenish Blue Artificial light: greener	Blue (8)	HUE: Daylight
Normal B Good 80 Fair —	Normal A Good 80 Very good —	Normal — Good 60 Very good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk, wool and nylon heavily stained Acetate slightly stained	— Silk and nylon slightly stain- ed. Acetate and wool un- stained	— Acetate unstained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose: discharge	Cellulose: urea process	PRINTING
ISO 5 4 3 1 1-2 2 1-2 — 1-2 —	ISO 4-5 4 4 1 1 1-2 1-2 — 2 —	ISO Direct ISO (8) 4 4 4-5 4-5 2-3 4-5 3 3-4 4 4 5 4-5 1-2 4 2 4 1-2 4 1-2 4	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good Considerably redder Considerably redder and duller Sensitive to hard water	Neutral: very good Alkaline: good Considerably greener Slightly duller	Neutral and alkaline: 5 5 4	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome tannage Paper	Paper	Leather Paper colouring	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 233—238

C.I. Direct Blue	233	234	235
CHEMICAL CLASS	Azo	Azo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Blue	Blue	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Moderate — Good —	Normal — Very good 95–100 Good 4	This C.I. Generic Name is no longer in use
OTHER FIBRES Dyeing Staining	— Wool unstained Acetate stained	— Acetate and wool stained	
PRINTING	Cellulose: urea process	Cellulose: urea process	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 3 2–3 4–5 5–6 6 2–3 3 3–4 2–3	ISO (4) 2–3 3 5 4–5 5 5–6 4 4 3–4 5	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: 4 4–5 3	Neutral: 2–3 Alkaline: 3 — —	
NOTES AND NON-TEXTILE USAGE		Covers dead cotton	

236	237	238	C.I. Direct Blue
Azo (metallised)	Azo (metallised)	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Blue	Greenish Blue Artificial light: slightly red- der	HUE: Daylight
Normal A Good — — —	Normal C Very good — — —	Normal A Good 93 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: with acetic acid Silk, wool and nylon stained Acetate unstained	Silk: neutral bath Silk heavily stained, wool and nylon stained Acetate unstained	— Acetate unstained Nylon stained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose: direct		PRINTING
ISO 4 4-5 4 — 5-6 — 2-3 — 2 —	ISO 4-5 3 4 — 6-7 — 2-3 — 3 —	AATCC 4 4 4 — 5-6 (viscose 6-7) — (II) 1 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good — —	Neutral: good — —	Neutral: 5 Alkaline: 4-5 — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Paper	Good fastness to treatment with urea-formaldehyde resins	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 239—245

C.I. Direct Blue	239	240, 241	242
CHEMICAL CLASS	Trisazo		Disazo
C.I. CONSTITUTION NUMBER	34175		
HUE: Daylight	Dull Blue		Dull Navy
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Very good 80 Fair 8	These C.I. Generic Names are no longer in use	Normal — — 80 — 3
OTHER FIBRES Dyeing Staining	— Acetate unstained		— Silk and wool slightly stained Nylon stained
PRINTING			Cellulose: discharge prints
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 5 4–5 4–5, 5, 4–5 4 5 5–6 4–5 4 5 5		ISO (3) 4–5 4–5 5 5–6 6–7 6–7 4 3 5 4
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: good Unaffected Slightly weaker, duller		Neutral: moderate Alkaline, with anthraquin- one: fair Weaker Unaffected Sensitive to hard water
NOTES AND NON-TEXTILE USAGE			Suitable for goods to be given crease-resist finishes

243	244	245	C.I. Direct Blue
Disazo	Disazo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Blue→Navy	Greenish Blue	Greenish Blue	HUE: Daylight
Normal — — 80 — —	Normal B — — — —	Normal B — 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: with acetic or formic acid —	Silk: at 40–60°C with acetic or formic acid Wool and acetate unstained	Silk: acetic acid —	OTHER FIBRES Dyeing Staining
Cellulose: discharge prints		Cellulose: discharge prints	PRINTING
ISO 4-5 3-4 4-5 5-6 6-7 7 2-3 3 3-4 1-2	ISO (on silk) — — 5 4 5 6 3 4-5 3-4 4	ISO (on silk) — — 2 3-4 4 5 3-4 4-5 4 3	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: moderate Alkaline: good Unaffected Unaffected Sensitive to hard water	Neutral: moderate Alkaline: fair Unaffected Weaker	Neutral: fair Alkaline: good Unaffected Redder Sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Suitable for goods to be given crease-resist finishes Unsuitable for goods to be vulcanised		Compatible with crease-resist resins, but unsuitable for vulcanising, PVC coating or continuous dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 246—251

C.I. Direct Blue	246	247	248
CHEMICAL CLASS	Azo	Trisazo	Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Navy Artificial light: redder	Reddish Navy (3)	Reddish Navy
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — — 3	Normal A — 60-90 Poor 3	Normal B Good 90 Good 4
OTHER FIBRES Dyeing Staining		— Silk heavily stained, wool stained Acetate and nylon heavily stained, polyester slightly stained	— Acetate and polyester slightly stained
PRINTING			Cellulose: direct and discharge prints
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) on viscose — — 5 — 6 — 4 2 5 5	ISO (3) 2-3 4-5 4-5 6-7 6-7 6-7 3-4 3 4-5 3-4	ISO Direct (4) 3-4 4-5 5 — 5 — 4-5 4 3 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	— — —	Neutral: moderate Alkaline, with anthraquinone: moderate-fairly good Duller Redder Slightly sensitive to hard water	Good — — Slightly sensitive to hard water
NOTES AND NON-TEXTILE USAGE			

249	250	251	C.I. Direct Blue
Azo	Azo (metallised)	Trisazo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Greenish Blue	Navy Artificial light: greener, duller	Reddish Navy Artificial light: duller	HUE: Daylight
Normal B Good 70 Good —	Normal C — 60 — —	Normal C — 80-100 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk, wool and nylon heavily stained. Acetate, polyester and polyacrylic unstained	— Silk and wool stained Nylon heavily stained	— Nylon stained	OTHER FIBRES Dyeing Staining
Cellulose: direct and discharge prints	Cellulose: discharge prints	Cellulose: suitable	PRINTING
ISO — — — 1 2 2 — — —	ISO 5 4-5 4-5 5-6 6 7 3-4 2 4 2	ISO 5 4 4 5 7 7-8 3 1-2 4 2	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good — —	Neutral and alkaline: good 4 3	Neutral: fair Alkaline: fair-poor 4 4	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Leather	Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 252—257

C.I. Direct Blue	252	253	254
CHEMICAL CLASS		Disazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Navy (4)	Blue	Navy
DYEING: CELLULOSE			
Dyeing method	—	Normal	Normal
S.D.C. Classification	B	B	C
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	—	—
Levelling	—	—	—
Suitable aftertreatment	4	5	5
OTHER FIBRES			
Dyeing			
Staining			
PRINTING		Cellulose: suitable	
FASTNESS PROPERTIES			
Method	ISO	ISO	ISO
	(4)		
Acid (organic)	—	4-5	3-4
Alkali	—	4-5	4-5
Hot pressing	5	—	—
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	4	4
normal	7-8	5	5
2 × normal	—	6	5
Washing — alteration	4-5	3-4	4
staining	4-5	5	5
Water — alteration	5	—	—
staining	5	—	—
OTHER PROPERTIES			
Dischargeability	—	Very good	Good
Effect of metals — Copper	3-4	Unaffected	Unaffected
Iron	4-5	Slightly affected	Unaffected
NOTES AND NON-TEXTILE USAGE			

255	256	257	C.I. Direct Blue
Tetrakisazo	Azo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Blue	Reddish Navy Artificial light: redder	HUE: Daylight
Normal A — — 5	Normal, without Na ₂ CO ₃ B Good 100 Fair 5	Normal C Good 90 Fair 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk, wool, acetate and nylon slightly stained	— Silk, wool and acetate slight- ly stained Nylon heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: suitable	Cellulose: urea process	Cellulose: urea process fol- lowed by steaming and after- treatment	PRINTING
ISO 4 4 — 4 4-5 4-5 3 5 — —	ISO 4-5 2 4-5 5-6 6 7 3 1-2 3-4 1	ISO (3) 4-5 3 5 7 7-8 7-8 3-4 3 5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: 4-5 Alkaline: 4	Neutral: poor-moderate Alkaline: moderate	Aftertreated (3): poor	OTHER PROPERTIES Dischargeability
Unaffected Unaffected	Unaffected Unaffected	Brighter Unaffected	Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Blue 258—263

C.I. Direct Blue	258	259	260
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	34138		
HUE: Daylight	Dull Blue	Reddish Navy Artificial light: redder	Reddish Navy Artificial light: redder
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 80 — —	Normal B Moderate 90–95 Moderate —	Normal B Slow 90–95 Moderate 5
OTHER FIBRES Dyeing Staining	— Silk and wool dyed lighter than cotton Acetate unstained	— Acetate, triacetate, polyester and polyacrylic stained Nylon heavily stained	— Acetate slightly stained, tri- acetate, polyacrylic and poly- ester stained. Nylon heavily stained
PRINTING	Cellulose: urea process with disodium orthophosphate		Cellulose: suitable
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4 3 4–5 5 5–6 3 — 4 —	ISO 4–5 4 3 — 7 7–8 4–5 5 —	ISO 2 2 3–4 — 7 7–8 2–3 1 4 1–2
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good Practically unaffected Practically unaffected	Poor Very slight Very slight Sensitive to hard water, less marked with soda in bath	
NOTES AND NON-TEXTILE USAGE		Covers dead cotton and ir- regular-dyeing viscose	

261	262	263	C.I. Direct Blue
Azo (metallised)	Phthalocyanine	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Blue	Greenish Blue	Reddish Blue	HUE: Daylight
			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: beater dyeing and coating Fastness on paper: light moderate; water, good; H ₂ SO ₄ 10%, 2; NaOH 10%, 3; Alum 10%, 4-5	Paper: beater dyeing and coating Fastness on paper: light moderate; water, v.good; H ₂ SO ₄ 10%, 2; NaOH 10%, 4-5; Alum 10%, 5	Paper: beater and surface dyeing Light fastness on paper, good; water bleed, good	NOTES AND NON-TEXTILE USAGE

NOTES

C.I. Direct Green	1	1:1	2
CHEMICAL CLASS	Trisazo	Trisazo	Tetrakisazo
C.I. CONSTITUTION NUMBER	30280	—	—
HUE: Daylight	Dull Green (Direct)	Dull Green (Direct)	Dull Green
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal (neutral) C Very good 80 — Metallic salts	Slightly different chemically from C.I. Direct Green 1 but very similar in properties and usage	— C — — —
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt Nylon: padding with amm. tartrate Cellulose, silk and wool dyed to same depth Acetate stained		Silk and wool dyed lighter than cotton Acetate slightly stained
PRINTING	Cellulose and silk: urea process + disodium orthophosphate Nylon: ammonium tartrate		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 5 1 3 — 3 — 2 — 4 *Aftertreated with CrF ₃	ISO Direct 3-4 1 3 1 1-2 2 2 — 3 2-3 5 3 —	ISO 5 3 — 1 1-2 2 2-3 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose, direct: neutral, good—very good; alkaline, good; After-treated: neutral and alkaline, good Silk, direct: neutral, fairly good Unaffected Unaffected		Very good
NOTES AND NON-TEXTILE USAGE	See Leather Dyes section Paper: beater dyeing Regenerated-cellulose film Aqueous inks		Reactions in substance H ₂ SO ₄ conc.—reddish blue, on dilm—greenish black and ppt NaOH—reddish brown

C.I. Direct Green 3—8

C.I. Direct Green	3	4	5
CHEMICAL CLASS	Trisazo		
C.I. CONSTITUTION NUMBER	32030		
HUE: Daylight	Green	Bluish Green	Bright Yellowish Green (Direct)
DYEING: CELLULOSE			
Dyeing method	Normal	—	Normal
S.D.C. Classification	—	B	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	80	—	—
Levelling	Fair	—	Very good
Suitable aftertreatment	—	—	10
OTHER FIBRES			
Dyeing			
Staining	Wool dyed lighter and silk much lighter than cotton Acetate unstained	Acetate and nylon unstained	Wool dyed much lighter than cotton Silk slightly stained Acetate and nylon unstained
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	AATCC ISO	ISO ISO Direct (10)
Acid (organic)	3	— 5	3-4 4
Alkali	3	— 4	4 3-4
Hot pressing	3	— 3	3 3
Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal	3	2 2	3 3
normal	4	3 3	3 3
2× normal	4	3 3	3 3
Washing — alteration	2-3	3-4 4	3-4 4-5
staining	—	—	—
Water — alteration	3	— 4	4 5
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Neutral: good-very good Alkaline: good	Neutral and alkaline: very good	Direct: neutral and alkaline, very good. Developed: neutral, very good; alkaline, good-very good
Effect of metals — Copper	Unaffected		Slightly affected
Iron	Bluer and duller Somewhat sensitive to hard water		Unaffected
NOTES AND NON-TEXTILE USAGE	Paper	Reactions in substance H ₂ SO ₄ conc.—black, on diln —dark bluish green	Leather

6	7	8	C.I. Direct Green
Trisazo 30295	Trisazo 30330	Trisazo 30315	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Green	Bluish Green	Dull Green (Direct)	HUE: Daylight
Normal (neutral) C Very good 80 — —	— — — — Fair—fairly good —	Normal B Good 60–100 — Metallic salts: 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool: ammonium acetate. Nylon: pad with ammonium tartrate and a solubilising agent. Silk and wool dyed to same depth as cellulose Acetate stained Nylon heavily stained	Silk and wool dyed to same depth as cellulose Acetate slightly stained	Wool and silk: Glauber's salt, neutral or with acetic acid Nylon: acetic acid Acetate stained	OTHER FIBRES Dyeing Staining
Nylon: ammonium tartrate and a solubilising agent			PRINTING
AATCC ISO 4 4 2 1–2 4 2–3 — 1 3 1–2 — 2 2 2 — — 2–3 2–3 — —	ISO 3 3–4 2 — 1–2 — 1–2 — —	AATCC ISO ISO Direct Direct * 4 4 4 4 3 4–5 3 3 3–4 — 2 — 2–3 3 1–2 — 3 — 2 2 3 — — — 2 2 4 — — — *Aftertreated with CrF ₃	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Cellulose: neutral, good—very good; alkaline, fairly good—good Silk: neutral, good Little duller Little duller Somewhat sensitive to hard water	Neutral, good Alkaline, fair—fairly good	Direct and aftertreated: neutral, good—very good; alkaline, good Little duller Little bluer, little duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Aqueous inks Pigments: heavy-metal salts See Leather Dyes section Paper: beater dyeing Regenerated-cellulose film Soap		See Leather Dyes section Paper: beater dyeing Regenerated-cellulose film	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 9—14

C.I. Direct Green	9	10	11
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	30310	30285	27540
HUE: Daylight	Dull Green	Dull Bluish Green	Bluish Green
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Very good 60–80 Fairly good —	— — — Good —	Normal — Good 60 Good–very good —
OTHER FIBRES Dyeing Staining	 Silk and wool dyed to same depth as cellulose Acetate stained	Silk —	Silk: neutral Wool dyed heavier than cotton, silk same depth as cotton Acetate stained Nylon dyed
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4 3 2 2 3 1–2 — 2 —	ISO 3–4 4 3 1 2 2 1–2 — 2 —	AATCC ISO 2–3 3 1 2 3 3–4 — 2 3–4 3 — 4 1 1–2 — — 2 2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good–very good Alkaline: fairly good Somewhat bluer Unaffected Somewhat sensitive to hard water	Neutral: good–very good Alkaline: fairly good — —	Cellulose: neutral, good–very good; alkaline, fairly good Silk: neutral, fairly good Little bluer Little bluer Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Aqueous inks Paper Soap		Leather: on chrome tannage Paper: beater dyeing

12	13	14	C.I. Direct Green
Trisazo 30290	Disazo 28470	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Bluish Green	Green	Dull Bluish Green	HUE: Daylight
Normal — Good — Good —	Normal — 80 Very good —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Nylon: acetic acid Silk and wool dyed heavier than cotton Acetate slightly stained	 Silk and wool dyed less heavy than cotton Acetate unstained	 Wool and silk dyed to same depth as cellulose Acetate slightly stained Nylon dyed	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC ISO 5 5 3 4-5 3 5 — — 3 4-5 — — 3 2 — — 2-3 2-3 — —	ISO 4 3 3 3 3 4-5 1-2 — 1-2 —	AATCC 5 3 4 — 2 — 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose: neutral, good—very good; alkaline, very good Silk: neutral, fairly good Changes to grey Considerably yellower and duller	Neutral: good Alkaline: fairly good Unaffected Trace bluer and duller	Neutral: fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome and veg- etable tannages Paper: beater dyeing	Paper	Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—blue, on diln —bluish green ppt NaOH 10%—blue (incom- plete)	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 15—20

C.I. Direct Green	15	16	17
CHEMICAL CLASS	Trisazo	Trisazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Green	Green	Dull Bluish Green
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good —	— C — — — —	Normal — — — Very good —
OTHER FIBRES Dyeing Staining	 Wool and silk dyed to same depth as cellulose Acetate slightly stained Nylon heavily stained	Nylon Wool and silk dyed to same depth as cotton Acetate appreciably stained	 Wool and silk dyed to same depth as cotton Acetate stained
PRINTING			Cellulose: urea process with disodium phosphate Silk and wool
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 5 1 3 — 2 — 4 — 1 —	ISO 4-5 2-3 4 1 1-2 2 2 — 2-3 —	ISO 4-5 2-3 4 1 2 3 3 — 2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good-good — Much bluer	Very good — —	Neutral: good-very good Alkaline: fairly good-good — —
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage Paper: beater dyeing Reactions in substance H ₂ SO ₄ conc.—bright reddish violet, on diln—green and dark green ppt Reactions on cellulose H ₂ SO ₄ 10%—slightly bluer, brighter NaOH 10%—yellowish olive	Reactions in substance H ₂ SO ₄ —blue (with brownish tinge), on diln—blue and ppt NaOH—violet blue	Paper

18	19	20	C.I. Direct Green
	Trisazo 30305	Trisazo 30380	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Green	Dull Green	Dull Green	HUE: Daylight
— B — — — —	— — — — Good —	Normal — — 60 Fairly good—good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed much lighter than cotton Acetate and nylon unstained	Silk —	Wool dyed as deep but slightly yellower than cotton. Silk not dyed so deep as cotton Acetate stained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process with disodium phosphate Silk Wool	PRINTING
AATCC ISO — 3-4 — 3 5 3 — 3 5 3 — 3 5 4 5 5 — —	ISO 3 3 3-4 1 2 2 1-2 2 —	ISO 3 3-4 3 1 2 2 1-2 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Alkaline: very good Slightly affected Slightly affected	Neutral: good Alkaline: fairly good — —	Neutral: good Alkaline: fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper		Paper Vegetable-ivory buttons	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 21—25

C.I. Direct Green	21	21:1	22
CHEMICAL CLASS	Trisazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER	31790	■	31775
HUE: Daylight	Dull Green		Dull Green→Olive (Direct) Brownish Olive (2, 7, 6)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fair — Good 6	Similar in general properties to C.I. Direct Green 21	Normal — — 80–100 Poor 2, 6, 7,
OTHER FIBRES Dyeing Staining	— Silk and wool stained brown Acetate unstained Nylon heavily stained brown		Silk and wool dyed lighter than cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 5 5 3 — 3–4 — 2 — 3 — 3 —	AATCC (6) 5 5 3 — 4 — 3 — 3 —	ISO Direct 3–4 3 4 2 3 4 1–2 — 2–3 — 3–4 4 4 — 3 — 3–4 — 3 — 3–4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Duller Little duller		Direct and coupled (7): neutral, good; alkaline, fairly good. Aftertreated (6) and (2): neutral and alkaline, good Unaffected Somewhat duller Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage	*Salicylic acid←benzi- dine→Chicago acid	Paper

23	24	25	C.I. Direct Green			
Trisazo 31985	Monoazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER			
Olive	Bright Green (Direct) Yellowish Green (3)	Dull Green	HUE: Daylight			
Normal — — 100 Fair —	Normal C — — — 3, 4	— — — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
Silk: neutral Silk dyed to same depth as cotton. Wool dyed lighter than cotton Acetate unstained	Coir and jute Silk dyed to same depth as cotton Wool dyed slightly weaker than cotton Acetate stained		OTHER FIBRES Dyeing Staining			
	Cellulose: urea process with disodium ortho- phosphate		PRINTING			
ISO 3 3-4 3-4 5-6 6 6-7 3 — 3 —	AATCC Direct 3 4 5 — 4-5 — 2 — 3-4 —	AATCC (3) 1 3 5 — 4-5 — 4 5 — —	ISO Direct 4 3 2 5 5-6 6 4 — 3-4 —	ISO (3) 1-2 3-4 2 5 5-6 6 4 — 4-5 —	ISO (4) — — — — 6 — 3 4 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Neutral: fair-fairly good. Alkaline: fair Unaffected Unaffected Somewhat sensitive to hard water	Direct and aftertreated: neutral and alkaline, fair	Neutral: moderate	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
Paper	Paper Leather		NOTES AND NON-TEXTILE USAGE			

C.I. Direct Green 26—29

C.I. Direct Green	26	27	27:1
CHEMICAL CLASS	Trisazo	Polyazo	
C.I. CONSTITUTION NUMBER	34045		
HUE: Daylight	Bluish Green	Bluish Green	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 100 — —	Normal B Fair 80–100 — —	Somewhat different chemically from C.I. Direct Green 27 but similar in properties and usage
OTHER FIBRES Dyeing Staining	Jute Silk and wool dyed lighter than cotton Acetate and nylon unstained	 Silk and wool dyed much lighter than cotton Acetate unstained Nylon heavily stained	
PRINTING	Cellulose: urea process with disodium orthophosphate Silk	Cellulose: urea process with disodium orthophosphate Silk	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC ISO 4 3 3 4 4 3 4–5 5 5 6 6 6 4 4 — — 4 4 — —	AATCC ISO 5 4–5 5 4–5 3 4 — 5–6 4 6 — 6–7 3 4 — — 3 3–4 — —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good—good Alkaline: fairly good Much yellower Duller and weaker	Neutral and alkaline: very good Unaffected Yellower and duller	
NOTES AND NON-TEXTILE USAGE	See Leather Dyes section Paper: beater dyeing Regenerated-cellulose film Reactions on cellulose H ₂ SO ₄ 10%—greenish blue NaOH 10%—yellowish olive	Leather: see Leather Dyes section Paper: beater dyeing Regenerated-cellulose film	

28	29	C.I. Direct Green																																																																													
Monoazo-anthraquinone 14155		CHEMICAL CLASS C.I. CONSTITUTION NUMBER																																																																													
Bright Yellowish Green (Direct) Yellowish Green (3)	Olive	HUE: Daylight																																																																													
Normal B — 80 — 3 and 4	Normal — — — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment																																																																													
Jute Silk dyed to same depth as cotton Wool dyed heavier than cotton Acetate stained	 Silk dyed much lighter than cotton Wool dyed lighter than cotton Acetate unstained	OTHER FIBRES Dyeing Staining																																																																													
Cellulose and silk: urea process with disodium ortho-phosphate Nylon: ammonium tartrate and a solubilising agent	Cellulose: urea process with di-sodium orthophosphate	PRINTING																																																																													
<table><tr><td>AATCC Direct</td><td>AATCC (3)</td><td>ISO Direct</td><td>ISO (3)</td><td>ISO (4)</td></tr><tr><td>2-3</td><td>1</td><td>3</td><td>1-2</td><td>—</td></tr><tr><td>4</td><td>4</td><td>3</td><td>3</td><td>—</td></tr><tr><td>5</td><td>5</td><td>2</td><td>2</td><td>—</td></tr><tr><td>—</td><td>—</td><td>5-6</td><td>5-6</td><td>—</td></tr><tr><td>4-5</td><td>4-5</td><td>5-6</td><td>5-6</td><td>6</td></tr><tr><td>—</td><td>—</td><td>6</td><td>6</td><td>—</td></tr><tr><td>2</td><td>3-4</td><td>4</td><td>3-4</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>4-5</td><td>5</td><td>3-4</td><td>4-5</td><td>3-4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (3)	ISO Direct	ISO (3)	ISO (4)	2-3	1	3	1-2	—	4	4	3	3	—	5	5	2	2	—	—	—	5-6	5-6	—	4-5	4-5	5-6	5-6	6	—	—	6	6	—	2	3-4	4	3-4	4	—	—	—	—	—	4-5	5	3-4	4-5	3-4	—	—	—	—	—	<table><tr><td>AATCC</td><td>ISO</td></tr><tr><td>—</td><td>3-4</td></tr><tr><td>—</td><td>4</td></tr><tr><td>4</td><td>5</td></tr><tr><td>—</td><td>5</td></tr><tr><td>6</td><td>6</td></tr><tr><td>—</td><td>6</td></tr><tr><td>3-4</td><td>3-4</td></tr><tr><td>—</td><td>—</td></tr><tr><td>—</td><td>2-3</td></tr><tr><td>—</td><td>—</td></tr></table>	AATCC	ISO	—	3-4	—	4	4	5	—	5	6	6	—	6	3-4	3-4	—	—	—	2-3	—	—	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
AATCC Direct	AATCC (3)	ISO Direct	ISO (3)	ISO (4)																																																																											
2-3	1	3	1-2	—																																																																											
4	4	3	3	—																																																																											
5	5	2	2	—																																																																											
—	—	5-6	5-6	—																																																																											
4-5	4-5	5-6	5-6	6																																																																											
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4-5	5	3-4	4-5	3-4																																																																											
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Direct and aftertreated: neutral and alkaline, fair Somewhat affected Somewhat affected	Neutral: good Alkaline: fairly good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron																																																																													
Paper Regenerated-cellulose film Leather: see Leather Dyes section	Paper Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE																																																																													

C.I. Direct Green 30—35

C.I. Direct Green	30	31	32
CHEMICAL CLASS	Anthraquinone		
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Yellowish Green	Green	Bluish Green
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — 60 Good —	Normal B — 60–80 — —	Normal — Good 100 Fair —
OTHER FIBRES Dyeing Staining	Silk: weak acid bath Silk and wool stained bluer Acetate slightly stained	— Acetate unstained Nylon tinted	 Wool dyed lighter and silk much lighter than cellulose Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 2 3 4–5 5 5–6 3* — 2–3* — *Improved by CrF ₃ treatment	ISO 5 5 4 6 7 7–8 3–4 — 4–5 —	ISO 3 3 3 5–6 6 6–7 2 — 2–3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Poor Little yellower Slightly duller	Neutral and alkaline: fair Unaffected Slightly affected	Neutral: fairly good Alkaline: very good Unaffected Trace bluer and duller
NOTES AND NON-TEXTILE USAGE			

33	34	35	C.I. Direct Green
Trisazo 34270	Disazo 27970	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Green	Green	Bluish Green	HUE: Daylight
Normal — — 100 Fairly good —	Normal — — 100 Poor —	Normal B — 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk weighted and un- weighted Wool dyed lighter than cotton Acetate unstained	Silk (unweighted) Acetate unstained	— Silk and wool slightly stained Acetate unstained at 40°C	OTHER FIBRES Dyeing Staining
		Cellulose: urea process with disodium orthophosphate	PRINTING
ISO 3-4 3-4 3 4-5* 5* 5-6* 2-3 — 3 —	ISO 2-3 3-4 3-4 6 6-7 6-7 3-4 — 3 —	AATCC ISO 3 3 3 3 5 2-3 4 5 5 5-6 6 6 2 4 — — 4-5 4 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: very good Unaffected Somewhat bluer and duller	Neutral and alkaline: fair good Unaffected Somewhat yellower and duller Very sensitive to hard water	Neutral and alkaline: fairly good Slightly affected Somewhat affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
*Much reduced by resin finishing Paper	Paper	Paper Regenerated-cellulose film	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 35:1—40

C.I. Direct Green	35:1	36	37
CHEMICAL CLASS	Trisazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER		31980	
HUE: Daylight		Dull Green	Olive (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Green 35 but similar in properties and usage	Normal — — 100 Poor —	Normal C — 80 — 4
OTHER FIBRES Dyeing Staining		Silk (unweighted) Silk dyed much lighter and wool lighter than cotton Acetate unstained	Jute Silk and wool dyed lighter than cotton. Acetate unstained—slightly stained. Nylon slightly stained
PRINTING			Cellulose: urea process with disodium orthophosphate
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		ISO 3 3-4 3-4 4-5 5 5 3-4 — 3 —	AATCC Direct ISO Direct ISO (4) — 3-4 3 — 3 3-4 4 4-5 3 — 5-6 5-6 6 6 6 — 6-7 6-7 3-4 3-4 4 — — — — 4 5 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: fairly good Alkaline: fair Unaffected Unaffected	Direct: neutral, good; alkaline, fairly good Aftertreated: alkaline with anthraquinone, fairly good—good Slightly affected Unaffected
NOTES AND NON-TEXTILE USAGE		Fastness to light reduced by resin finishes	Paper Leather: see Leather Dyes section

38	39	40	C.I. Direct Green
Disazo 28280	Trisazo 30220		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Green (10)	Dull Olive (8, 9 and 10)	Olive (8)	HUE: Daylight
— — Fair 80 Good 7 and 10	Normal — Good 80-100 Poor-fair 8, 9 and 10	— — — — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acetic acid and Glauber's salt Silk and wool dyed lighter than cotton. Acetate unstained to sl. stained. Nylon heavily stained	— Acetate and nylon stained Wool dyed lighter, silk a little lighter than cotton		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (7) 5 5 5 — 2 — 2-3 5 —	AATCC (10) 5 4 5 — 3 — 4 5 —	ISO (10) 4 3-4 2-3 2 2 3 3-4 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	ISO (8) 3 5 5 2 3 3 3-4 — —	ISO (9) 4 5 5 2 3 3 3-4 — —	
	ISO (10) 3 5 5 2 2 3 3 — —	ISO (8) 3 4 — — 2 — 3 — —	
Cellulose (10): neutral and alkaline, fairly good-good Silk (10): neutral, fairly good Unaffected Somewhat weaker	Developed (8 and 9): neutral, good; alkaline, fairly good Developed (10): neutral and alkaline, fairly good Unaffected Unaffected	Neutral and alkaline: very good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome tannage; fast to washing on chrome suede leather			NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 41—46

C.I. Direct Green	41	42	43
CHEMICAL CLASS	Polyazo	Disazo	Trisazo
C.I. CONSTITUTION NUMBER		28290	34280
HUE: Daylight	Green (8)	Bluish Green (10)	Dull Bluish Green→Bluish Grey (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good 8 and 10	Normal — — — — 10	Normal — — — — 8
OTHER FIBRES Dyeing Staining	— Silk and wool dyed Acetate and nylon heavily stained		— Silk and wool dyed Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8 and 10) 5 1 5 — 1-2 — 3 — 4-5 —	ISO (10) 3 4 3 — 4-5 — 4 — 4 —	ISO (8) 3 3-4 3 3 3 4 4 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Developed: neutral, very good Much yellower and duller Considerably weaker	Neutral and alkaline: good	Neutral and alkaline: good Trace weaker Trace weaker
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—bright violet, on diln—violet black soln, black ppt Reactions on cellulose H ₂ SO ₄ 10%—duller NaOH 10%—blackier		

44	45	46	C.I. Direct Green		
	Polyazo	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER		
Bluish Green (8)	Dull Green (10)	Bluish Green (10) Reddish Blue (8) Black (9)	HUE: Daylight		
Normal — — — Good 8	Normal — Good — Good 10	Normal — Good — Good 8, 9 and 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		
	Wool	—	OTHER FIBRES Dyeing		
	Silk, wool and nylon slightly stained Acetate unstained	Wool heavily stained Acetate and nylon unstained	Staining		
			PRINTING		
ISO (8) 3 4 3-4 — 2 — 3 — 3-4 —	AATCC (10) 4 4 5 — 4 — 5 — 5 —	AATCC (10) 4 4 4 4 — 4 — 3 — 4 —	AATCC (8) 4 4 4 4 — 4 — 3 — 4 —	AATCC (9) 4 4 4 4 — 3 — 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline; good	Cellulose: neutral, good; alkaline, good Trace weaker Trace weaker	Developed (10): neutral, very good Trace bluer Trace duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		
	Reactions in substance H ₂ SO ₄ conc.—black, on diln—reddish blue	Reactions in substance H ₂ SO ₄ conc.—slate grey, on diln—violet NaOH 10%—violet	NOTES AND NON-TEXTILE USAGE		

C.I. Direct Green 47—51:1

C.I. Direct Green	47	48	49
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER			28480
HUE: Daylight	Green (10)	Dull Bluish Green (8)	Yellowish Green (10)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good — — 10	Normal B — 80–100 — 8	Normal — — 80 Good 10
OTHER FIBRES Dyeing Staining	Silk (unweighted): formic acid Silk and wool dyed Acetate and nylon unstained	— Silk slightly stained Wool heavily stained Acetate unstained	— Silk and wool dyed Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (10) 5 — 3 4 4–5 5 4–5 — 4–5 —	ISO (10) 5 2–3 2 4 4–5 5 5 — 5 —	ISO (8) 3–4 2 3 3 4 4–5 3–4 — 4–5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: very good Much duller Appreciably yellower, little duller	Neutral and alkaline: good– very good Slightly affected Somewhat affected	Neutral: good Alkaline: good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Stable to resin finishes Reactions in substance H ₂ SO ₄ conc.—black, on diln —reddish blue and ppt		

50	51	51:1	C.I. Direct Green
Trisazo 34295	Trisazo 34260		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Yellowish Green (8) Somewhat yellower and brighter (10)	Dull Green (9 and 10) Dull Bluish Green→Greenish Grey (8)		HUE: Daylight
Normal — — 100 Poor 8 and 10	Normal B Very good 100 — 8, 9 and 10	Slightly different chem- ically from C.I. Direct Green 51 but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk and wool dyed Acetate unstained	Silk and wool dyed Acetate unstained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO (8 and 10) 4 4 3 3 3 3 3-4 4 —	AATCC (10) — — — — 4-5 — 3-4 — — —	ISO (8) 4 4 3-4 4 5 5-6 4-5 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Developed (8): neutral and alkaline, good Developed (10): neutral, fairly good; alkaline, good Somewhat bluer Trace yellower	Developed (10): neutral and alkaline, very good Developed (8): neutral and alkaline, fairly good-good Unaffected Somewhat weaker and duller		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Green	52	53	54
CHEMICAL CLASS	Polyazo		Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Green (8)	Green (10)	Dull Bluish Green (6)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — 80–100 — 8	Normal — — — Good—very good 10	Normal — Good — Good 6
OTHER FIBRES Dyeing Staining	 Silk and wool heavily stained Acetate unstained	 Silk and wool dyed Acetate unstained	 Wool and silk dyed Acetate unstained Nylon slightly stained
PRINTING			
FASTNESS PROPERTIES Method	AATCC (8)	ISO (8)	AATCC (6)
Acid (organic)	3	3	5
Alkali	1	2	5
Hot pressing	5	2	4
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	3	—
normal	4–5	3	2
2× normal	—	4	—
Washing — alteration staining	4	3	4
Water — alteration staining	5	5	4
OTHER PROPERTIES Dischargeability	Developed (8): neutral and alk- aline, good	Developed (10): neutral and alkaline, very good	Cotton: neutral, fair Viscose: neutral, very good
Effect of metals — Copper Iron	Trace affected Considerably affected	Unaffected Unaffected	Unaffected Weaker
NOTES AND NON-TEXTILE USAGE			Reactions in substance H ₂ SO ₄ conc.—olive, on diln—olive ppt NaOH 10%—insoluble

55	56	57	C.I. Direct Green
Disazo 25315	Disazo	Disazo 24130	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Bluish Green (7)	Dull Green (7)	Green (7)	HUE: Daylight
Normal — — 40 Fair 7	— — — 40–60 Very good 7	— — — — — 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Acetate stained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO (7) 3 5 4 3 4 5 2–3 — 3–4 —	ISO (7) 4–5 4 4–5 2 3 3 3–4 — 3–4 —	ISO (7) 3 5 4 — 2 — 2–3 — 3–4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good Duller Unaffected Somewhat sensitive to hard water	Neutral: very good Alkaline: good — —	Fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Destroyed by resin finishes	Reactions in substance H ₂ SO ₄ conc.—violet, on diln—bluish black ppt NaOH—dull red		NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 58—63

C.I. Direct Green	58	59	60
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	30225	34040	22315
HUE: Daylight	Dull Green (7 and 10) Dull Yellowish Green (8)	Green (3)	Dull Yellowish Green (7)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fairly good—good 100 Fair—fairly good 7, 8, 10	Normal C — — — 3	— — Good 60 Good 7
OTHER FIBRES Dyeing Staining	 Silk and wool dyed much lighter than cotton Acetate slightly stained Nylon heavily stained	— Silk and wool heavily stained Acetate unstained	— Acetate stained
PRINTING		Cellulose: urea process with NaOH, Na ₂ HPO ₄ and a solubilising agent. Prints stained and aftercoppered	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (7) 5 5 4 — 3–4 — 2–3 — 1–2 — (7) 3 4 4 2 3 3 3 3 — 3–4 — (8) 4–5 4 5 1 2 3 4 4 5 — — ISO (10) 4–5 4 5 1 2 3 4 4–5 — 4–5 — ISO (7) 4–5 4 4–5 3 3–4 3–4 3–4 — 4 —	AATCC (3) 2 4 5 — 4 — 4–5 — 5 — (3) 1 4 1 4 4–5 4 4 — 4–5 — Neutral: fairly good Alkaline: good	ISO (7) 4–5 4 4–5 3 3–4 3–4 3–4 — 4 — Neutral: very good Alkaline: good
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	(7): neutral, good; alkaline, fairly good (8): neutral and alkaline, good—very good (10): neutral, good—very good; alkaline, good Unaffected Slightly duller Somewhat sensitive to hard water	Neutral: fairly good Alkaline: good	Neutral: very good Alkaline: good
NOTES AND NON-TEXTILE USAGE	Reactions on cellulose H ₂ SO ₄ 10%—no change NaOH—darker Leather: on chrome tannage Paper: beater dyeing and coating	Leather	

61	62	63	C.I. Direct Green
Trisazo	Trisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Green	Dull Yellowish Green	Bright Yellowish Green Bluer in artificial light	HUE: Daylight
Normal — Very good 60-80 Good —	Normal — Very good — Good —	Normal B Good 50 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate stained	— Acetate stained	Wool and silk: acetic acid Acetate, polyester and acrylic unstained Nylon slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: direct (urea) process	Cellulose: direct (urea) process	Cotton: direct and discharge	PRINTING
ISO 4 3-4 3-4 2 2 3 3 2 3 2	ISO 4 3 3-4 1-2 2 3 3 2 3 1-2	ISO 3 4 5 5-6 6 6-7 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: 5 2 3	Neutral and alkaline: 5 1 3	Neutral: good (fair on silk); alkaline, fair Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather Paper	Leather Paper	Compatible with most resin finishes Paper: beater and surface dye- ing. Fastness: H ₂ SO ₄ 1%, moderate; NaOH 1%, mod- erate; Light, good; Water, good Reactions in substance H ₂ SO ₄ conc.—violet, on diln —bluish green	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green	64	65	66			
CHEMICAL CLASS	Azo (metallised)	Monoazo	Stilbene (Trisazo)			
C.I. CONSTITUTION NUMBER						
HUE: Daylight	Dull Green	Yellowish Green Yellower in artificial light	Yellowish Green			
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — —	Normal C Very good 80–90 Good 3, 4, 5	Normal, without soda ash B Good 90 Good 4			
OTHER FIBRES Dyeing	Silk: neutral	Silk: neutral or acid	Silk: acetic acid			
Staining	Wool and nylon stained Acetate unstained	Acetate and polyester unstained Wool and nylon heavily stained	Acetate, triacetate, acrylic and polyester unstained Nylon slightly stained			
PRINTING	Cellulose: direct					
FASTNESS PROPERTIES Method	ISO	ISO Cotton Direct	ISO Cotton (3)	ISO Viscose Direct	ISO Direct	ISO (4)
Acid (organic)	4–5	1	1	1	4–5	—
Alkali	4–5	2	3–4	2	4	—
Hot pressing	4	5	5	5	5	—
Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal	—	5	5	5–6	6	—
normal	4–5	5–6	5–6	6	6–7	6
2 × normal	—	6	6	6–7	7	—
Washing — alteration	2–3	4–5	4–5	4–5	4–5	4–5
staining	—	4–5	4–5	5	4–5	4–5
Water — alteration	4–5	4–5	4–5	5	5	5
staining	—	3–4	5	3–4	3–4	5
		Light fastness unaffected by resin finishes				
OTHER PROPERTIES Dischargeability	Neutral: fairly good	Not dischargeable			Not dischargeable	
Effect of metals — Copper Iron	— —	Slightly affected Slightly affected			Unaffected Unaffected Insensitive to hard water	
NOTES AND NON-TEXTILE USAGE	Paper	Leather: on chrome tannage Paper Reactions in substance H ₂ SO ₄ conc.—yellowish brown, on diln— bluish green			Leather: see Leather Dyes section Paper Fast to resin finishing Reactions on fibre H ₂ SO ₄ conc.—no altera- tion, on diln—greyish green	

67	68	69	C.I. Direct Green
Polyazo	Azo	Polyazo (copper complex)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Green Yellower in artificial light	Yellowish Green	Dull Green	HUE: Daylight
Neutral B Good 90-95 Good 3, 4	Normal B Very good 100 Poor 5	Normal B Fair 90-95 Good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained Nylon stained	— Acetate slightly stained	Silk: acetic acid Acetate and polyester un- stained Wool and nylon stained	OTHER FIBRES Dyeing Staining
Cellulose: direct and discharge		Cellulose: direct and discharge	PRINTING
ISO (3) 4 2 5 6-7 7 7 4 4-5 5 5	ISO (4) 4-5 3 5 5 5-6 6-7 4-5 4-5 5 5	ISO Direct (5) 5 4 3 6 6-7 6-7 4-5 3 4-5 3	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
With anthraquinone: good — —	Neutral: 4; alkaline: 4 Unaffected Slightly duller and weaker Slightly sensitive to hard water	Neutral: poor Alkaline: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome tannage, aftercoppered Unaffected by resin finishing	Fast to resin finishing Reactions in substance H ₂ SO ₄ conc.—olive, on diln—no change	Fastness developed (5) Washing, 4-5, 4-5; Water, 4-5, 5 Leather: see Leather Dyes section Unaffected by resin finishing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 70—75

C.I. Direct Green	70	71	72
CHEMICAL CLASS	Azo		Trisazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Olive		Dull Green
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Excellent 100 Fair 4	This C.I. Generic Name is discontinued	Normal A Poor 80 Good 5
OTHER FIBRES Dyeing Staining	— Acetate unstained Nylon slightly stained		— Acetate unstained
PRINTING			Cellulose: direct and discharge
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO Direct 5 4 5 5-6 6 6 3-4 4 4-5 4 5	ISO (4) 5 4-5 5 5-6 6 6 5 5 5 5 5	ISO Direct 5 4-5 2-3 6 6-7 7 2-3 3-4 3-4 2 4 4 5 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: 3; alkaline: 4 — — Insensitive to hard water		Neutral and alkaline: good Unaffected Slightly duller Slightly sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Leather Fast to resin finishing		Reactions in substance H ₂ SO ₄ conc.—dull red-dish brown, on diln—green

73	74	75	C.I. Direct Green
Trisazo	Azo	Phthalocyanine	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Bright Green	Bluish Green	HUE: Daylight
Neutral C Very good 100 Poor 5	Neutral, avoid prolonged boiling A Poor 80 Very good —		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral Acetate slightly stained	— Acetate unstained		OTHER FIBRES Dyeing Staining
Cellulose: direct and discharge			PRINTING
ISO Direct 4-5 2-3 3 5 5-6 6 3 3 4 3	ISO (5) — — 5 — 5 — 4-5 3-4 5 5	ISO Direct 3-4 4 2 3 3-4 4 1 2-3 2 2	ISO (5) — — 4-5 — 3 — 2 2-3 4-5 4-5
Neutral and alkaline: good	Neutral and alkaline: good		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Duller and redder Slightly weaker and duller Insensitive to hard water	Unaffected Duller Slightly sensitive to hard water		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Reactions in substance H ₂ SO ₄ conc.—dull bluish violet, on diln—dull yellowish green	Reactions in substance H ₂ SO ₄ conc.—brownish olive, on diln—bluish green	Paper: beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 76—81

C.I. Direct Green	76	77	78
CHEMICAL CLASS	Azo	Polyazo	Monoazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Green Yellower in artificial light	Dull Bluish Green	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal, unaffected by long boiling — — — — —	— B — 80 — —	Properties and usage very similar to those of C.I. Direct Green 24
OTHER FIBRES Dyeing Staining	Silk (unweighted) Wool somewhat stained Silk and acetate unstained Nylon slightly stained	Silk: acetic or formic acid Wool and silk unstained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Cotton 4-5 3-4 — 5 5-6 6 3 1-2 4 2 ISO Silk — — — 4 4-5 — 4 4-5 4 3-4	ISO Cotton 5 4-5 4-5 6 6-7 7 2 2 3 2 ISO Silk — — — 4 5 5-6 3-4 4-5 4 4	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cotton: alkaline, good Silk: moderate-fairly good Unchanged Slightly weaker and duller Somewhat sensitive to hard water	Neutral and alkaline: poor Unchanged Weaker Sensitive to hard water	
NOTES AND NON-TEXTILE USAGE			

79	80	81	C.I. Direct Green
Disazo	Monoazo	Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Green Yellower in artificial light	Yellowish Green	Bluish Green	HUE: Daylight
Normal — — 80 4, poor coverage of dead cotton 5	— — Good 70 Very good Metallic salts	Normal — Good 90 Good 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk slightly stained, nylon very slightly stained, acetate, acrylic, polyester and wool unstained	Silk: acetic acid Nylon: acetic acid Acrylic, acetate and polyester unstained Wool heavily stained	Nylon Acetate, acrylic and polyester unstained Wool heavily stained	OTHER FIBRES Dyeing Staining
—	Cellulose: direct	Cellulose: direct	PRINTING
ISO 4-5 4-5 2-3 6 6-7 7 1 2 3 1-2	ISO Direct 4 4-5 4 — 6 — — — 3 4-5	ISO Direct — — — — 5-6 — — — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good No change Yellower and duller	Poor Not affected Darker	Not dischargeable Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Suitable for high temp. and continuous dyeing Resin finishing causes change in hue and lower fastness to light	Paper: beater dyeing and surface coating	Paper Very good fastness to resin finishing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Green 82

C.I. Direct Green	82	
CHEMICAL CLASS	Polyazo	
C.I. CONSTITUTION NUMBER		
HUE: Daylight	Bright Bluish Green	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Poor-fair 100 Good 5	
OTHER FIBRES Dyeing Staining		
PRINTING	Cellulose: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4 3-4 Bl. 7 7-8 7-8 (40°C) 2 3 3-4 2-3	ISO (5) — — — — 7 — 4 4 3-4 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Poor Unaffected Unaffected Sensitive to hard water	
NOTES AND NON-TEXTILE USAGE		

C.I. Direct Brown	1	1:1	1:2
CHEMICAL CLASS	Trisazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER	30045		30110
HUE: Daylight	Brown	Brown	Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 100 — 2, 7	Slightly different chemically from C.I. Direct Brown 1 but similar in properties and usage	For properties and usage see Direct Brown 1
OTHER FIBRES Dyeing Staining	— Silk and wool dyed as cotton Acetate stained, nylon dyed		
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC Direct 5 3 3 — 1-2 — (I) 2-3 — 2-3 — ISO Direct 2 3 2 1 1 2 2 — 2-3 — ISO (2) 3 4 3-4 2 2-3 3 3 — 3-4 — ISO (7) 2 3-4 3-4 1-3 2 3 2-3 — 3-4 —		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: good—fairly good Aftertreated (2): fairly good Coupled (7): neutral, very good; alkaline, fairly good Yellower and duller Yellower Somewhat sensitive to hard water		
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Paper: beater dyeing Fastness properties: light, fair; water, good; sulphuric acid, fair; caustic soda, fair		

C.I. Direct Brown 2—6

C.I. Direct Brown	2	3
CHEMICAL CLASS	Disazo	Azo
C.I. CONSTITUTION NUMBER	22311	
HUE: Daylight	Reddish Brown (Direct). Dull Reddish Brown (2) Reddish Brown (6). Dull Reddish Brown→blackish brown (8) Blackish Brown (9)	Blackish Brown
DYEING: CELLULOSE		
Dyeing method	Normal	Normal
S.D.C. Classification	C	A
Exhaustion	Fairly good	—
Temp. of maximum affinity °C	60–80	—
Levelling	—	—
Suitable aftertreatment	2, 6, 8, 9, (7)	—
OTHER FIBRES		
Dyeing	Silk: with Glauber's salt Nylon: with ammonium tartrate	
Staining	Wool dyed as cotton, silk lighter. Acetate stained, nylon dyed	
PRINTING	Cellulose: urea process with disodium orthophosphate Nylon: with ammonium tartrate	
FASTNESS PROPERTIES		
Method	AATCC Direct	ISO
Acid (organic)	3	3–4
Alkali	5	3
Hot pressing	3	2
Light: $\frac{1}{2}$ normal	2	4
normal	3	4
2× normal	4	4–5
Washing — alteration	(I) 3	1
staining	—	—
Water — alteration	3	2
staining	—	—
OTHER PROPERTIES		
Dischargeability	Direct: neutral, good–very good; alkaline, fairly good–good Aftertreated (2): neutral, fairly good–good; alkaline, fairly good Aftertreated (6): neutral, good–very good; alkaline, good Developed (8) and (9): neutral, good–very good; alkaline, fairly good	Neutral and alkaline: very good
Effect of metals — Copper Iron	Practically unaffected Practically unaffected	Trace redder Trace yellower
NOTES AND NON-TEXTILE USAGE	Heavy metal salts used as pigments Paper: beater dyeing Leather: See Leather Dyes section	

4	5	6	C.I. Direct Brown
Azo	Trisazo 30135	Trisazo 30140	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown	Brown	Brown (Direct)	HUE: Daylight
Normal — — — Good —	Normal — — 80 Good —	Normal — Good 100 Good 2, 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter Acetate practically un- stained. Nylon reserved in alkaline baths	Silk: neutral Silk and wool dyed as cot- ton. Acetate stained	Silk: neutral or with Glauber's salt and acetic acid Silk and wool dyed equal to cotton Acetate stained, nylon dyed	OTHER FIBRES Dyeing Staining
Cellulose: urea process			PRINTING
ISO 3-4 5 4-5 1 2-3 2-3 3-4 — 4-5 —	ISO 2 3-4 3 2 3 3 1-2 — 2 —	AATCC Direct ISO Direct ISO (2) ISO (7) 3 3 4 3-4 2 3 4 4 3 3 4 4 — 2 — — 2-3 2-3 5 2-3 — 3 — — (1) 2-3 2 2-3 3 — — — — 4 2 3-4 4 — — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Slightly yellower Unaffected	Neutral: very good—good Alkaline: good Somewhat heavier, redder Unaffected	Direct: neutral and alkaline, good Aftertreated (2): neutral and alk- aline, good Coupled (7): neutral, good; alkaline fairly good Redder Yellower Very sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: See Leather Dyes section		Leather: see Leather Dyes section Paper: beater dyeing Fastness properties: caustic soda 1%, poor—fair; sulphuric acid 1%, good; light, fair; water, good Silk: dischargeability, neutral, fairly good	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 6:1—11

C.I. Direct Brown	6:1	7	8
CHEMICAL CLASS	Trisazo	Trisazo	Azo
C.I. CONSTITUTION NUMBER		30035	
HUE: Daylight	Brown (Direct)	Brown (Direct) Reddish Brown (7)	Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Brown 6, but similar in properties and usage	Normal — — 80 Fairly good 7	Normal — Fair — Fair —
OTHER FIBRES Dyeing Staining		— Wool dyed as cotton Acetate stained	— Silk and wool dyed as cotton Acetate slightly stained Nylon heavily stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 1 4 3-4 1-2 2 2-3 3 — 2 —	AATCC 3 5 4 — 2 — (I) 2 — 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Direct: neutral and alkaline, fairly good Coupled (7): neutral, fairly good; alkaline, fair — —	— Unaffected Weaker
NOTES AND NON-TEXTILE USAGE			

9	10	11	C.I. Direct Brown	
		Stilbene	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Brown (Direct)	Brown (Direct), redder on aftertreatment (2)	Reddish Brown (Direct)	HUE: Daylight	
Normal — — — — 2	Normal — — — — 2	Normal — Good — Good 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
Wool with Glauber's salt and ammonium acetate. Silk with Glauber's salt and acetic acid Acetate stained	— Acetate stained	— Silk and wool dyed lighter than cotton. Acetate unstained Nylon slightly stained	OTHER FIBRES Dyeing Staining	
			PRINTING	
ISO Direct 3 4 4 — 3 — 2 3 —	ISO Direct 3 3-4 4 3 4 4 3-4 4 —	AATCC Direct 2 5 3 — 2 — (II) 3 4 —	ISO Direct 1-2 3 3 — 1 2 2 3-4 — 2-3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Direct: neutral and alkaline, good Aftertreated (2): neutral, fairly good; alkaline, good Unaffected Unaffected	Neutral and alkaline: fair Practically unaffected Practically unaffected	Direct: neutral, very good; alkaline, fairly good Aftertreated (2): neutral, fairly good; alkaline, fair Unaffected Weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: See Leather Dyes section		Leather: occasional use on chrome tannages	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Brown 11:1—16

C.I. Direct Brown	11:1	12	13
CHEMICAL CLASS			Polyazo
C.I. CONSTITUTION NUMBER			35710
HUE: Daylight	Reddish Brown (Direct)	Dull Reddish Orange→Brown	Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Brown 11 but similar in properties and usage	Normal C — 80 — —	Normal — — — Fairly good—good —
OTHER FIBRES Dyeing Staining		— Silk, wool and nylon dyed as cotton Acetate stained	— Silk dyed equal to cotton Wool dyed lighter than cotton Acetate slightly stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		ISO 3–4 4 1 1 2 3 2–3 — 2–3 —	ISO 4–5 4–5 — — 2 — 2–3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: very good Alkaline: good Slightly affected Slightly affected	Neutral: good — —
NOTES AND NON-TEXTILE USAGE		Leather	

14	15	16	C.I. Direct Brown
Polyazo 35715	Trisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brownish Olive	Brown (Direct)	—	HUE: Daylight
Normal — — Good —	Normal C — — — 2, 4	This C.I. Generic Name is no longer in use	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton Acetate slightly stained	— Silk dyed equal depth but yellower than cotton. Wool dyed lighter and redder than cotton. Acetate stained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO 5 4-5 — — 2-3 — 3-4 — 4 —	ISO Direct 4-5 2 4 1 1 2 2 — 2 —	ISO (2) 4 3 4 2 3 4 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good—good — —	Direct: neutral and alkaline, good Aftertreated (2): neutral and alk- aline, fairly good Slightly affected —		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 17—22

C.I. Direct Brown	17	18	19
CHEMICAL CLASS	Trisazo	Disazo	
C.I. CONSTITUTION NUMBER	30100	20220	
HUE: Daylight	—	Brown	Dull Yellowish Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — — —	Normal — — 100 Fairly good —	Normal — — — Very good 2
OTHER FIBRES Dyeing Staining		— Wool and silk dyed equal to cotton Acetate slightly stained	— Silk dyed as cotton Wool dyed as cotton Acetate stained
PRINTING			Cellulose: urea process with disodium orthophosphate Wool and silk
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 1 4 3 — 2 — 1 — 1 —	ISO 4 3 2 1 2 3 1 — 1 —	ISO Direct ISO (2) 1 2 5 4 4 5 2 3 3 4 3 5 3 4 — — 1-2 3-4 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral and alkaline: poor Unaffected Unaffected	Direct: neutral, very good; alkaline, good—very good Aftertreated (2): neutral and alkaline, fairly good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE		Leather Paper: beater dyeing	Paper: beater dyeing

20	21	22	C.I. Direct Brown
Trisazo 30060	Trisazo 30155	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Brown (Direct)	Brown	—	HUE: Daylight
Normal — — 100 Good 7	Normal — Good 100 Good —	Normal — — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed equal to cotton Acetate stained. Nylon dyed		OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 4 4-5 2 2 3 2-3 — 2-3 —	AATCC ISO 4 3 2 4 3 3 — 2 2-3 3 — 3 (I) 3-4 1-2 — — 3-4 2 — —	ISO 4 3 4 — 2 — 2-3 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good — —	Neutral: good—very good Alkaline: good Redder and weaker Somewhat redder and duller		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather Paper	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 23—25:1

C.I. Direct Brown	23	24
CHEMICAL CLASS		Trisazo
C.I. CONSTITUTION NUMBER		31700
HUE: Daylight	Reddish Brown	Dull Reddish Brown
DYEING: CELLULOSE		
Dyeing method	Normal	Normal
S.D.C. Classification	—	—
Exhaustion	—	—
Temp. of maximum affinity °C	—	100
Levelling	—	Fair
Suitable aftertreatment	—	—
OTHER FIBRES		
Dyeing		—
Staining		Silk and wool dyed heavier than cotton Acetate stained
PRINTING		
FASTNESS PROPERTIES		
Method	ISO	ISO
Acid (organic)	5	3
Alkali	5	4-5
Hot pressing	3	3
Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal	—	1-2
normal	2-3	2
2 × normal	—	2-3
Washing — alteration	3	2-3
staining	—	—
Water — alteration	—	3
staining	—	—
OTHER PROPERTIES		
Dischargeability		Neutral: good Alkaline: fairly good
Effect of metals — Copper		—
Iron		—
NOTES AND NON-TEXTILE USAGE		Leather Paper

25	25:1	C.I. Direct Brown
Polyazo 36030	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown→Reddish Brown (Direct)	Brown→Reddish Brown (Direct)	HUE: Daylight
Normal C Fairly good—good 80–100 — 2, 3	Slightly different chemically from C.I. Direct Brown 25, but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: neutral Silk and wool dyed as cotton Acetate stained. Nylon dyed		OTHER FIBRES Dyeing Staining
		PRINTING
AATCC AATCC AATCC ISO ISO Direct (2) (3) Direct (2) 4 — — 3 4 2 — — 3–4 3–4 3 — — 4 4 — — — 2 2–3 1–2 3–4 4–5 3 3–4 — — — 3 4 (I) 2–3 (II) 3 (II) 4 2 3 — — — — — 3 4 4–5 2–3 3–4 — — — — —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose, direct: neutral, fair; alkaline, fair; aftertreated (2): neutral, fairly good—good Silk, direct: neutral, fairly good Redder, somewhat weaker Yellower, somewhat weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section Paper: beater dyeing Soap		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 26—29

C.I. Direct Brown	26	27
CHEMICAL CLASS	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER	31730	31725
HUE: Daylight	Dull Reddish Brown	Dull Reddish Brown (Direct) Dull Brown (2) Reddish Grey (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 100 Fair —	Normal C Fairly good—good 80–100 — 2, 4, 8
OTHER FIBRES Dyeing Staining	— Silk and wool dyed lighter than cotton. Acetate stained Nylon heavily stained	Wool: with Glauber's salt and ammonium acetate Silk and wool dyed lighter than cotton Acetate unstained—stained. Nylon dyed
PRINTING		Cellulose: urea process with disodium orthophosphate
FASTNESS PROPERTIES Method	AATCC ISO	AATCC AATCC AATCC ISO ISO ISO ISO Direct (2) (4) Direct (2) (4) (8)
Acid (organic)	2 3	2 3 3 2 3-4 3-4 3
Alkali	2 4	4 2-3 2-3 2-3 4 4 2-3
Hot pressing	3 3	3 3 5 2 3-4 3-4 2-3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	— 2	— — — 3 3-4 3-4 3-4
normal	1-2 2	2 4 4 4 4-5 4 4-5
2 × normal	— 3	— — — 4-5 4-5 4-5 5
Washing — alteration	(I) 2 2	(I) 1 (I) 2-3 (I) 3 2-3 3-4 3-4 2-3
staining	— —	— — — — — — —
Water — alteration	1-2 2	1-2 4 5 3 4 5 3-4
staining	— —	— — — — — — —
OTHER PROPERTIES Dischargeability	Neutral: fairly good—good Alkaline: fairly good	Direct, neutral: fair—fairly good; alkaline, fair Aftertreated (2): neutral and alkaline, fairly good
Effect of metals — Copper Iron	Unaffected Unaffected	Practically unaffected Practically unaffected
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Paper: beater dyeing Aqueous inks	Leather: see Leather Dyes section Paper: beater dyeing

28	29	C.I. Direct Brown																																																		
	Stilbene 40505	CHEMICAL CLASS C.I. CONSTITUTION NUMBER																																																		
—	Brown (Direct)	HUE: Daylight																																																		
This C.I. Generic Name is no longer in use	Normal B Good — — 2, 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment																																																		
	— Silk and wool dyed lighter than cotton Acetate and nylon slightly stained	OTHER FIBRES Dyeing Staining																																																		
		PRINTING																																																		
	<table><tr><td>AATCC Direct</td><td>AATCC (2)</td><td>AATCC (3)</td><td>ISO Direct</td><td>ISO (2)</td></tr><tr><td>3</td><td>4</td><td>4</td><td>1-2</td><td>1-2</td></tr><tr><td>3</td><td>4</td><td>4</td><td>4</td><td>4</td></tr><tr><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>2</td><td>3</td></tr><tr><td>3</td><td>3-4</td><td>3</td><td>2</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>2-3</td><td>4</td></tr><tr><td>(II) 3</td><td>(II) 4</td><td>(II) 4</td><td>3</td><td>2-3</td></tr><tr><td>4</td><td>5</td><td>5</td><td>2-3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (2)	AATCC (3)	ISO Direct	ISO (2)	3	4	4	1-2	1-2	3	4	4	4	4	4	4	3	3	3	—	—	—	2	3	3	3-4	3	2	3	—	—	—	2-3	4	(II) 3	(II) 4	(II) 4	3	2-3	4	5	5	2-3	3	—	—	—	—	—	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
AATCC Direct	AATCC (2)	AATCC (3)	ISO Direct	ISO (2)																																																
3	4	4	1-2	1-2																																																
3	4	4	4	4																																																
4	4	3	3	3																																																
—	—	—	2	3																																																
3	3-4	3	2	3																																																
—	—	—	2-3	4																																																
(II) 3	(II) 4	(II) 4	3	2-3																																																
4	5	5	2-3	3																																																
—	—	—	—	—																																																
	Direct: neutral, good–very good; alkaline, fair Aftertreated (2): neutral, fairly good; alkaline, fair Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron																																																		
	Leather: see Leather Dyes section Paper	NOTES AND NON-TEXTILE USAGE																																																		

C.I. Direct Brown 30—33

C.I. Direct Brown	30	31	31:1
CHEMICAL CLASS	Monoazo	Polyazo	Polyazo
C.I. CONSTITUTION NUMBER	17630	35660	
HUE: Daylight	Dull Brown	Reddish Brown (Direct)	Reddish Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 80 — —	Normal C Good 100 — 2	Slightly different chemically from C.I. Direct Brown 31, but similar in properties and usage
OTHER FIBRES Dyeing Staining	Silk and wool: with Glauber's salt and acetic acid. Also from a neutral bath Wool dyed equal to cotton, silk lighter. Acetate slightly stained, nylon stained	— Silk and wool dyed lighter than cotton. Acetate stained, nylon heavily stained	
PRINTING		Cellulose; the conc. brand applied by the urea process with disodium orthophosphate	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC 2-3 4 — — 2 — 1-2 — 2	ISO 3 5 1 2 3 2 2-3 —	AATCC Direct 3-4 2 4-5 1 1-2 2 (I) 3-4 3 — Direct 3 3 3 2-3 2 2-3 3 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: poor Unaffected Unaffected	Direct: neutral, good; alkaline, fairly good Aftertreated (2): neutral, fair-fairly good; alkaline, fairly good Slightly redder Unaffected	
NOTES AND NON-TEXTILE USAGE	Leather: on chrome and vegetable tannage Paper: beater dyeing Fastness Wool (ISO): Alkali, 4; Carbonising, 4; Decatising, 5; Hot pressing, 3; Light, 4, 4, 4-5; Milling, 3-4; Perspiration, 3-4; Water, 4-5; Washing, 4	Leather: see Leather Dyes section Paper: beater dyeing The heavy metal salts have pigment usage	

32	33	C.I. Direct Brown
Trisazo 34015	Polyazo 35520	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Orange Brown	Dull Reddish Brown (Direct)	HUE: Daylight
Normal C Good 60 — —	Normal B Fairly good—good 100 — 2, 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: with Glauber's salt or formic acid Wool dyed equal to cotton, silk lighter Acetate stained, nylon dyed	— Wool and silk dyed somewhat lighter and yellower than cotton. Acetate stained, nylon dyed	OTHER FIBRES Dyeing Staining
	Cellulose: the conc. brand applied by the urea process with disodium orthophosphate	PRINTING
AATCC ISO 3 3 5 5 3 3 — 3 3 3 — 4 (I) 3 1-2 — — 4 1-2 — —	AATCC AATCC AATCC ISO ISO Direct (2) (3) Direct (2) 5 5 5 3-4 3-4 4 5 4 3 4 5 5 5 4 4 — — — 1 3 3 3-4 3-4 2 3-4 — — — 3 4 (I) 4 (II) 4 (II) 4 2 2-3 — — — — — 3-4 5 4-5 2-3 3-4 — — — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Cellulose: neutral, good; alkaline, fairly good Silk: neutral, fairly good—good Practically unaffected Somewhat duller	Direct: neutral, good—very good; alkaline, good Aftertreated (2): neutral and alkaline, good Practically unaffected Practically unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome and occasionally on vegetable tannage Paper: suitable and of good light fastness	Leather: see Leather Dyes section Paper: beater dyeing	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 33:1—38

C.I. Direct Brown	33:1	34	35
CHEMICAL CLASS	Polyazo	Stilbene	Trisazo
C.I. CONSTITUTION NUMBER		40510	
HUE: Daylight	Dull Reddish Brown (Direct)	Brown	Dull Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Brown 33, but similar in properties and usage	Normal B — 100 — —	Normal — Good — Good 2, 3
OTHER FIBRES Dyeing Staining		— Silk and wool dyed lighter than cotton. Acetate and nylon slightly stained	— Silk and wool dyed equal to cotton. Acetate slightly stained, nylon dyed
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		AATCC ISO — 2-3 — 3 4 4 — 2 3 2 — 3 (II) 3 4 — — — 4 — —	AATCC AATCC AATCC Direct (2) (3) 3 4 4 5 4 3 3 4 4 — — — 2 3-4 2-3 — — — (I) 2 (III) 4 (II) 4 — — — 4 4 4 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: fairly good Alkaline: fair Slightly affected Slightly affected	Direct: neutral, good Unaffected Redder and weaker
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section Paper	Leather: occasional use on chrome tannage Paper: beater dyeing

36	37	38	C.I. Direct Brown			
Trisazo	Disazo 20090	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER			
Dull Reddish Brown	Reddish Brown	Brown (Direct)	HUE: Daylight			
Normal — Good — Good —	Normal — — 80 Fairly good —	Normal C — — — 2, 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
— Silk and wool dyed lighter than cellulose. Acetate unstained, nylon heavily stained	— Wool dyed heavier than cellulose. Acetate stained	— Wool somewhat lighter than cotton. Silk equal depth but yellower than cotton. Acetate stained	OTHER FIBRES Dyeing Staining			
			PRINTING			
AATCC 5 5 3 — 3 — (II) 4 4 —	ISO 2 4 3 1 1 2 1-2 —	AATCC Direct 1-2 1-2 5 — 2-3 — (II) 2 2 —	ISO Direct 2 2 2 1 1 2 2 — 3 —	ISO (2) 3-4 3 3 2 3 4 3-4 — 3 —	ISO (4) — — — — 4 — 3-4 — 2-3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Unaffected Weaker	Neutral: good-fairly good Alkaline: fairly good Somewhat duller and yellower Somewhat yellower	Direct: neutral, very good; alkaline fairly good Aftertreated (2): neutral, good; alkaline, fairly good Affected —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
Leather: on chrome and occasionally on vegetable tannage		Paper	NOTES AND NON-TEXTILE USAGE			

C.I. Direct Brown 39—44

C.I. Direct Brown	39	40	41
CHEMICAL CLASS	Polyazo	Azo	Trisazo
C.I. CONSTITUTION NUMBER	35060		
HUE: Daylight	Reddish Brown	Brown	Dull Reddish Orange → Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 7, 8	Normal — Good — Good —	Normal B — — — 4
OTHER FIBRES Dyeing Staining		— Silk and wool dyed equal depth to cotton. Acetate heavily stained, nylon dyed	Silk dyed equal depth but redder than cotton. Wool dyed equal to cotton. Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{8}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 3 4 2 1 2 2 1-2 — 1 —	ISO (7) 3 4 3 — 2-3 — 3 — 1-2 —	ISO (8) 3 4 3 — 2-3 — 3 — 1-2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: neutral and alkaline, good Aftertreated (7) and (8): neutral and alkaline, good — —	Neutral: very good Weaker and duller Unaffected	Neutral: very good Alkaline: fair Slightly affected —
NOTES AND NON-TEXTILE USAGE		Leather: on chrome and combined tannages Paper: beater dyeing	Leather: on chrome tannages Paper: beater dyeing

42	43	44	C.I. Direct Brown
Trisazo	Polyazo 35700	Polyazo 35005	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Orange→ Brown	Dull Reddish Brown (Direct)	Brown (Direct) Reddish Brown (8)	HUE: Daylight
Normal B — 100 — —	Normal — Good 100 Very good 2, 6	Normal C Good — — 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed lighter than cotton Wool slightly stained. Ace- tate unstained to slightly stained	— Acetate stained	— Silk and wool dyed heavier than cotton. Acetate stained, nylon dyed	OTHER FIBRES Dyeing Staining
	Cellulose, wool and silk: suit- able for direct print styles	Cellulose: for direct print and discharge styles	PRINTING
ISO 4 1-2 2 2 3 3 3-4 — 3-4 —	ISO Direct 4-5 4 4 2 2-3 2-3 3-4 — 3-4 —	ISO (2) 4-5 5 4 3 3-4 4 4-5 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good Somewhat affected —	Direct; neutral and alkaline, very good. Aftertreated (2): neutral and alkaline, fairly good. After- treated (6): neutral, very good; alkaline, fairly good — —	Direct: neutral and alkaline, good Coupled (8): neutral and alkaline, good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Leather	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 44:1—49

C.I. Direct Brown	44:1	45	46
CHEMICAL CLASS	Polyazo	Polyazo	Trisazo
C.I. CONSTITUTION NUMBER	35010		31785
HUE: Daylight	Brown (Direct) Reddish Brown (8)	Dull Brownish Olive (Direct) becoming redder on aftertreatment (2)	Dull Brownish Olive (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Similar in properties and usage to C.I. Direct Brown 44	Normal C — 80-100 — 2	Normal C — 60 — (2)
OTHER FIBRES Dyeing Staining		— Silk dyed lighter and redder than cotton. Wool heavily stained. Acetate stained	— Silk and wool dyed lighter than cotton. Acetate unstained to stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO Direct 4 2 4 1 1 1 3 3-4 —	ISO (2) 4 2 5 2 3 4 3-4 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Direct: neutral, very good; alkaline, good Aftertreated (2): neutral and alkaline, fair Somewhat affected Slightly affected	Neutral: good Alkaline: fairly good Little redder Somewhat redder and weaker Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Leather	

47	48	49	C.I. Direct Brown			
	Trisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER			
—	Brownish Olive (Direct)	Brown (Direct)	HUE: Daylight			
Normal — — — — —	Normal — Fairly good — Good 1, 6	Normal — Good — Good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
	— Silk and wool dyed lighter than cotton. Acetate slightly stained, nylon heavily stained	— Silk and wool dyed heavier than cotton. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining			
			PRINTING			
AATCC 5 3-4 3 2 3 3 (II) 2-3 — 3-4 —	AATCC Direct 3 3 3 3 — 4 — (I) 3 — 2 —	AATCC (1) 3 3 3 3 — 5 — (I) 4 — 5 —	AATCC (6) 3 3 3 3 — 4 — (I) 3 — 3 —	AATCC Direct 3 4 3 — 4 — (I) 2 — 2-3 —	AATCC (3) 3 3 4-5 3 — 5 — (I) 4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: very good Redder Unaffected	Neutral: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE			

C.I. Direct Brown 50—55

C.I. Direct Brown	50	51	52			
CHEMICAL CLASS	Disazo	Trisazo	Trisazo			
C.I. CONSTITUTION NUMBER	20091	31710	31885			
HUE: Daylight	Brown	Brownish Olive (Direct)	Brownish Olive (Direct) becoming greener on coupling (7)			
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 7, 8	Normal B — 100 — 2, 7	Normal — Good 100 Fairly good—good 2, 7			
OTHER FIBRES Dyeing Staining		— Silk and wool dyed lighter than cotton. Acetate stained, nylon dyed	— Silk dyed as cotton, wool somewhat lighter. Acetate stained, nylon heavily stained			
PRINTING						
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 3 4 2-3 1 2 2 1-2 — 1 — —	ISO Direct 3-4 4 3-4 2 3 3 2 3 3 2-3 — 3 — —	ISO (7) 3 4 3 3 2 3 2 2 2 2-3 — 3 — —	ISO Direct 3-4 4 3-4 2 2 3 2 3 2-3 — 3 — —	AATCC Direct 2-3 3 3 — 2-3 — (I) 1-2 — 3 — —	ISO Direct 3-4 3-4 3-4 2 2 3 2 3 2-3 — 3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: neutral and alkaline, good Coupled (7) and (8): neutral and alkaline, good — —	Direct: neutral, very good; alkaline, good. Aftertreated (2): neutral and alkaline, good Coupled (7): neutral and alkaline, very good — —	Direct: neutral, good; alkaline, fairly good—good Coupled (7): neutral, good; alkaline, fairly good Unaffected Slightly redder Somewhat sensitive to hard water			
NOTES AND NON-TEXTILE USAGE			Leather: occasional use on chrome tannage Paper Aqueous inks			

53	54	55	C.I. Direct Brown
Monoazo 13320	Trisazo 31735	Monoazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Brown (Direct)	Brown (Direct)	Brownish Olive	HUE: Daylight
Normal — — — — 6	Normal — — 80 Fairly good—good 2	Normal C — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed equal to cotton Acetate stained	— Silk dyed heavier, wool much heavier and redder than cotton. Acetate slightly stained	OTHER FIBRES Dyeing Staining
		Cellulose: direct print styles	PRINTING
ISO Direct 5 5 3-4 — 2-3 — 1-2 — 2 —	ISO (6) — — — — — — 3 — — —	ISO 4-5 5 1-2 1 2 3 2-3 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: good — —	Direct: neutral, fairly good—good; alkaline, fair—fairly good Aftertreated (2): neutral, fairly good; alkaline, fair — —	Neutral and alkaline: poor — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 56—60

C.I. Direct Brown	56	57									
CHEMICAL CLASS	Disazo	Trisazo									
C.I. CONSTITUTION NUMBER	22040	31705									
HUE: Daylight	Dull Reddish Brown→Dull Bordeaux (Direct)	Dull Reddish Brown (Direct)									
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 6, 7, 8	Normal C Fairly good 80 — 2, 3, 4, 6									
OTHER FIBRES Dyeing Staining		— Silk and wool dyed equal to cotton Acetate and nylon heavily stained									
PRINTING											
FASTNESS PROPERTIES Method	ISO Direct	ISO (6)	ISO (7)	ISO (8)	AATCC Direct	AATCC (6)	ISO Direct	ISO (2)	ISO (3)	ISO (4)	ISO (6)
Acid (organic)	3-4	3-4	4	4	5	5	4	4	5	—	5
Alkali	3	3	3-4	3-4	5	5	4	3	5	—	5
Hot pressing	3	3-4	3	3-4	3	3	2	4	3-4	—	3-4
Light: 1/8-1/2 normal	—	—	—	—	—	—	1	2	—	—	—
normal	3	2-3	2-3	2-3	2	2	1	3	4-5	3-4	2
2× normal	—	—	—	—	—	—	2	3	—	—	—
Washing — alteration	3	3	3-4	3-4	(II) 2	(II) 3	1-2	3-4	3-4	3	3
staining	—	—	—	—	—	—	—	—	—	—	—
Water — alteration	2-3	3	3-4	4	2	3	2	4	2-3	4	2
staining	—	—	—	—	—	—	—	—	—	—	—
OTHER PROPERTIES Dischargeability	Direct and aftertreated (6), (7) and (8): neutral and alkaline, good-very good				Direct: neutral, very good; alkaline, fairly good Aftertreated (2): neutral and alkaline, fairly good						
Effect of metals — Copper Iron	— —				Duller Slightly duller						
NOTES AND NON-TEXTILE USAGE					Leather						

58	59	60	C.I. Direct Brown		
Disazo 22340	Disazo 22345	Disazo 22325	CHEMICAL CLASS C.I. CONSTITUTION NUMBER		
Brown (Direct)	Blackish Brown (Direct)	Yellowish Brown (Direct)	HUE: Daylight		
Normal C Good 80 — 2	Normal C Fair 80 — 2, 3	Normal — — — Good 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		
— Silk and wool equal to cotton Acetate slightly stained, nylon heavily stained	Wool and silk: neutral or acid dye-bath Nylon: with acetic acid Silk and wool heavier than cotton Acetate stained, nylon heavily stained		OTHER FIBRES Dyeing Staining		
Cellulose: urea process with disodium orthophosphate Wool and silk: suitable			PRINTING		
AATCC Direct 4 5 2-3 — 3-4 — (I) 2-3 — 2-3 —	AATCC Direct 5 4 3 — 3-4 — (I) 3-4 — 2 —	AATCC (3) 4 3 — — 4 — (I) 4-5 — 4-5 —	ISO Direct 3 3 3 4 1 4 2 5 1-2 — 2 —	ISO (2) 3-4 4 3-4 3 4 4-5 4 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Direct: neutral, very good; alkaline, good Aftertreated (2): neutral and alkaline, fairly good Appreciably affected Slightly affected	Direct: neutral, good; alkaline, fairly good Aftertreated (2): neutral, fairly good; alkaline, fair Practically unaffected Practically unaffected	Direct: neutral and alkaline, fairly good—good Aftertreated (2): neutral and alkaline, poor — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		
Leather: see Leather Dyes section Paper: beater dyeing The aluminium salts are used as pigments	Leather: occasional use on chrome and vegetable tannages		NOTES AND NON-TEXTILE USAGE		

C.I. Direct Brown 61—65

C.I. Direct Brown	61	61:1	62
CHEMICAL CLASS	Trisazo		Trisazo
C.I. CONSTITUTION NUMBER	30055		31720
HUE: Daylight	Reddish Brown (Direct)	Reddish Brown (Direct)	Reddish Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Fairly good 100 — 2, 8	Slightly different chemically from C.I. Direct Brown 61, but similar in properties and usage	Normal C — 80 Poor 1
OTHER FIBRES Dyeing Staining	— Silk yellower, wool lighter than cotton Acetate stained		— Wool dyed lighter than cotton Acetate stained
PRINTING	Cellulose: direct print styles		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 2 2 5 — 2-3 — (I) 1 — — — —	ISO Direct 2-3 3 2 1 1-2 2 3 2-3 3 — — — —	ISO Direct 1 3-4 4 1 2 3 3 1-2 — 2 — — — — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and aftertreated (2): neutral, good; alkaline, fairly good Developed (8): neutral and alkaline, good Slightly affected Somewhat affected		Neutral: fairly good—good. Alkaline: fairly good Markedly weaker Unaffected Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Paper		Leather Aqueous inks

63	64	65	C.I. Direct Brown
Polyazo 35040			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	—	Dull Orange→Brown	HUE: Daylight
Normal — — — —	This C.I. Generic Name is no longer in use	Normal B — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 1 4 3 — 2 — 1 1 —		AATCC ISO 4-5 4-5 3 3 2-3 3 2 2 3 3 3-4 4 (II) 3-4 4 — — 2 2 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
		Neutral: very good Alkaline: good	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: on chrome tannage Covers irregular quality viscose yarn	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 66—71

C.I. Direct Brown	66	67	68
CHEMICAL CLASS		Disazo	Trisazo
C.I. CONSTITUTION NUMBER		26230	30125
HUE: Daylight	Dull Yellowish Brown	Reddish Brown	Reddish Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — —	Normal — — 80 Fairly good —	Normal — — 100 Poor 7, 8
OTHER FIBRES Dyeing Staining		— Wool dyed heavier than cotton Acetate stained	— Silk and wool dyed lighter than cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3–4 4–5 4 2 3 3 4 — 4 —	ISO 2 4 2 1 2 2 1 — 1 —	ISO Direct ISO (7) 4 4 4 4 4 4 2 2 3 3 3 3 2 3 — — 2–3 3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: fair — —	Neutral: good Alkaline: fairly good Trace weaker Unaffected	Direct: neutral, good; alkaline, fairly good Coupled (7): neutral, good–very good; alkaline, fairly good Somewhat weaker, redder Unaffected
NOTES AND NON-TEXTILE USAGE		Unsuitable for goods to be given anticrease finishes	Dyed direct the hue is destroyed by anticrease finishes

69	70	71	C.I. Direct Brown
Trisazo 30365	Polyazo 35530		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Brown (Direct)	Dull Reddish Brown	—	HUE: Daylight
Normal — — 80 Fair —	Normal — Good—very good 100 Good—very good —	This C.I. Generic Name is no longer in use	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton Acetate stained	— Acetate slightly stained		OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2 4 4 2 3 3 2 — 2 —	ISO 4-5 4 4 2 2-3 2-3 3-4 — 3-4 —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Alkaline: fairly good—good Unaffected Unaffected	Neutral and alkaline: good — —		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Unsuitable for goods to be given an antcrease finish	Leather		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 72—76

C.I. Direct Brown	72	73	74
CHEMICAL CLASS		Polyazo	Polyazo
C.I. CONSTITUTION NUMBER		35535	36300
HUE: Daylight	—	—	Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	This C.I. Generic Name is no longer in use	Normal — 100 Fairly good —	Normal — Good — Good 2
OTHER FIBRES Dyeing Staining		— Acetate stained	Silk: from a neutral dyebath Silk and wool dyed equal to cotton. Acetate heavily stained, nylon dyed
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining		ISO 4-5 3 5 2-3 3 4 4-5 — 4 —	AATCC ISO ISO Direct Direct (2) 3 1-2 1 2 3 3 5 3 4 2 2 — 3 3 5 4 4 — (I) 4 1-2 2 — — — 2 1-2 3 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral and alkaline: good- very good — —	Direct: neutral, fairly good- good; alkaline, fairly good Aftertreated (2): neutral, good; alkaline, fairly good Appreciably yellower Much yellower
NOTES AND NON-TEXTILE USAGE			Leather: occasional use on chrome tannage

74:1	75	76	C.I. Direct Brown
	Trisazo 30325	Pentakisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown (Direct)	Dull Reddish Brown	Dull Brown (Direct)	HUE: Daylight
Slightly different chemically from C.I. Direct Brown 74, but similar in properties and usage	Normal C — — —	Normal C — — 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed lighter than cotton Acetate stained	— Silk and wool dyed heavier than cotton Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO 4 4-5 3 1 1-2 2 1-2 — 3 —	ISO Direct (2) 4 4 4-5 1-2 2 3 2 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Good — —	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: see Leather Dyes section		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 77—82

C.I. Direct Brown	77	78	79
CHEMICAL CLASS	Trisazo	Stilbene	Trisazo
C.I. CONSTITUTION NUMBER		40290	30050
HUE: Daylight	Dull Reddish Brown	Dull Reddish Orange→Brown	Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — —	Normal — — 100 Fair —	Normal — — 80 Fairly good —
OTHER FIBRES Dyeing Staining	— Silk and wool dyed equal to cotton Acetate slightly stained	— Silk and wool dyed lighter than cotton Acetate stained	— Silk and wool dyed equal to cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{4}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3–4 3–4 3 1 2 2–3 2 — 3–4 —	ISO 4 4 3 4 5 5 2–3 — 2–3 —	ISO 3 4 2–3 2 2 3 2 — 1–2 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Very good — —	Neutral: poor Alkaline: fair Unaffected Trace redder	Neutral: good Alkaline: fair Unaffected Unaffected Somewhat sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Light fastness adversely affected by antcrease finishes	

80	81	82	C.I. Direct Brown	
Disazo 20210	Tetrakisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Yellowish Brown	Dull Brownish Olive	—	HUE: Daylight	
Normal — — — — —	Normal C — — — —	Normal — — — Good 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
	— Silk dyed heavier and wool dyed lighter than cotton Acetate appreciably stained	— Silk and wool dyed equal to cotton Acetate slightly stained	OTHER FIBRES Dyeing Staining	
	Cellulose: for direct print styles		PRINTING	
ISO 5 3 2 1 2 3 1 — 1 —	ISO 4 3-4 3 1 1-2 2 2-3 — 3 —	ISO Direct 3 2-3 4 4 4-5 5 3 — 2-3 —	ISO (2) — 3 — 5 5-6 6 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Very good — —	Neutral: moderate Alkaline: poor — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
Leather: see Leather Dyes section			NOTES AND NON-TEXTILE USAGE	

C.I. Direct Brown 83—88

C.I. Direct Brown	83	84	85
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	—	—	—
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	95	95	60-95
Levelling	Good	Good	Good
Suitable aftertreatment	2	2	—
OTHER FIBRES			
Dyeing	—	—	—
Staining	Acetate stained	Acetate stained	Silk and wool dyed equal to cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES			
Method	ISO Direct	ISO Direct	ISO
Acid (organic)	3	(2) 3	4
Alkali	3	3-4	3
Hot pressing	4	4	4-5
Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal	2	2-3	1-2
normal	2-3	3-4	2
2 × normal	3	4	2-3
Washing — alteration	3	3	3
staining	—	—	—
Water — alteration	2-3	3	3
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Neutral: good Alkaline: moderate	Neutral: good Alkaline: moderate	Neutral: good Alkaline: moderate
Effect of metals — Copper	—	—	—
Iron	—	—	—
NOTES AND NON-TEXTILE USAGE			

86	87	88	C.I. Direct Brown
Disazo 22030			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown	Yellowish Brown (Leather)	Brown (on Leather)	HUE: Daylight
Normal C — — — —			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed equal and wool heavier than cotton Acetate heavily stained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 2 3 1 1-2 2 2 2 — 2-3 —			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good — —			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 89—94

C.I. Direct Brown	89	90	91
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Reddish Brown (on Leather)	Yellowish Brown (on Leather)	Brown (on Leather)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment			
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section	Leather: see Leather Dyes section	Leather: see Leather Dyes section

92	93	94	C.I. Direct Brown
	Trisazo 31860		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Yellowish Brown (on Leather)	Reddish Brown (on Leather)	Reddish Brown (on Leather)	HUE: Daylight
			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section	Leather: see Leather Dyes section	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 95—99

C.I. Direct Brown	95	95:1	96
CHEMICAL CLASS	Trisazo		Trisazo (metallised)
C.I. CONSTITUTION NUMBER	30145		—
HUE: Daylight	Reddish Brown (Direct)	—	Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 100 — 3, 4	Slightly different chemically from C.I. Direct Brown 95, but similar in properties and usage	Normal — — 100 Good —
OTHER FIBRES Dyeing Staining	Silk: Glauber's salt and acetic acid Silk dyed as cotton; wool lighter Acetate unstained to slightly stained Nylon heavily stained		— Acetate slightly stained
PRINTING	Cellulose and silk: concentrated brand applied by urea process with disodium orthophosphate. Also for discharge grounds		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 3 3 5 4 5-6 6 (I) 3 — 2 — ISO Direct 3 3-4 4 5 5-6 6 2-3 — 2-3 — ISO (3) — — — — — ISO (4) 5 4-5 4 5 6 6-7 3-4 — 4-5 —		ISO 4 4 4-5 5-6 6 6-7 3-4 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and aftertreated: neutral and alkaline, good Practically unaffected Practically unaffected Very sensitive to hard water		Neutral and alkaline: good-very good — —
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section Heavy metal salts have pigment usage Paper: beater dyeing Plastics: for dyeing casein-formaldehyde		Paper: beater dyeing

97	98	99	C.I. Direct Brown
		Trisazo 34020	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brownish Grey→Blackish Brown	Dull Yellowish Brown	Reddish Brown	HUE: Daylight
Normal B — — — —	Normal B — — — —	Normal C Fair-fairly good 60-100 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk much lighter than cotton; wool lighter and greener than cotton Acetate unstained, nylon slightly stained	— Silk dyed bluer, wool redder and darker than cotton Acetate stained	— Wool dyed yellower than cotton Acetate stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with addition of disodium orthophosphate		Cellulose: direct prints	PRINTING
AATCC ISO — 3-4 — 4 4-5 4 — 5-6 6-7 6-7 — 6-7 (I) 4-5 3 — — — 2 — —	AATCC ISO — 3-4 — 3-4 3-4 3-4 — 5 6 6 — 6-7 (I) 2-3 3 — — — 3 — —	ISO 4 5 3 4 4-5 5 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: fair Unaffected Unaffected	Neutral: fairly good-good Alkaline: fair-fairly good — —	Neutral: fairly good Alkaline: good Little duller Little yellower	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section	Leather: see Leather Dyes section	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 100—104

C.I. Direct Brown	100	100:1	101
CHEMICAL CLASS	Polyazo		Trisazo
C.I. CONSTITUTION NUMBER	35800		31740
HUE: Daylight	Yellowish Brown	—	Brown (Direct)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 100 Fair —	Slightly different chemically from C.I. Direct Brown 100 but similar in properties and usage	Normal B Good 100 — 2
OTHER FIBRES Dyeing Staining	Weighted and unweighted silk: dyed neutral Silk dyed equal to cotton, wool lighter. Acetate and nylon heavily stained		— Wool dyed as cotton, silk lighter. Acetate stained, nylon heavily stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC ISO 5 3 4 4 5 4 — 4-5 4 5 — 5-6 (I) 1 2 — — 2 2 — —		AATCC ISO ISO Direct Direct (2) 3-4 1 2-3 2 1 2 3 3-4 4-5 — 4-5 5 4-5 5 5-6 — 5-6 6 (I) 1-2 2 2-3 — — — 1-2 2 2-3 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good—good Alkaline: fair Redder Yellower		Direct: neutral and alkaline, fair Unaffected Little duller and weaker Sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Leather: dyed on chrome tan- nage Paper: beater dyeing		Leather: see Leather Dyes section Paper

102	103	104	C.I. Direct Brown
Stilbene			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Brown	Dull Reddish Brown (Direct)	Dull Orange→Brown	HUE: Daylight
Normal — — 40-80 Good-very good —	Normal B — 80-100 — 3, 4	Normal B — — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate stained	— Wool and silk dyed lighter than cotton Acetate unstained	Silk —	OTHER FIBRES Dyeing Staining
	Cellulose: urea process with addition of disodium ortho-phosphate	Cellulose: concentrated brand applied by the urea process with addition of disodium orthophosphate	PRINTING
ISO 4-5 4 4 4 4 4-5 3 — 3 —	AATCC Direct — — 4 — 6 — (I) 4 — — —	ISO Direct 5 3-4 3-4 6 6-7 6-7 3-4 — 3 —	ISO (4) 5 5 4 4-5 5 6 4-5 — 5 —
		AATCC 4-5 3 4 4 4-5 5 (II) 4 — 3-4 —	ISO 4-5 3 3-4 5 6 6 4 4 —
			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fair — —	Direct: neutral, fairly good-good; alkaline, fairly good Aftertreated (4): fair Slightly affected Slightly affected	Neutral: good Alkaline: fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Paper: beater dyeing Leather: see Leather Dyes section	Leather: on chrome tannages	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 105—109

C.I. Direct Brown	105	106	106:1
CHEMICAL CLASS	Trisazo	Polyazo	
C.I. CONSTITUTION NUMBER		36200	
HUE: Daylight	Brown	Dull Orange→Brown (Direct)	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good — Good —	Normal — Good 100 Poor 6	Slightly different chemically from C.I. Direct Brown 106, but similar in properties and usage
OTHER FIBRES Dyeing Staining	Nylon Wool and silk dyed equal to cotton. Acetate slightly stained, nylon heavily stained	Weighted and unweighted silk Wool and silk dyed lighter than cotton. Acetate stained, nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC AATCC (on nylon) 5 — 1-2 — 5 — — — 4-5 4-5 — — (I) 3 4-5 — — 2 — — —	AATCC AATCC ISO Direct (6) Direct 2-3 3 1 3 2-3 5 5 3 2-3 — — 5 5 5-6 5-6 — — 5-6 2 (I) 2-3 2 — — — 2 3 2 — — —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	On nylon: neutral, fairly good —good Much redder Much weaker	Neutral: good—very good Alkaline: good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE	Leather	Leather: on chrome tannage Paper: beater dyeing Inks and water colours	

107	108	109	C.I. Direct Brown		
Stilbene	Stilbene	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER		
Dull Orange→Brown	—	Brown	HUE: Daylight		
Normal C — 100 — 3, 4	Normal — — 60–80 Fairly good —	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment		
— Silk dyed lighter than cotton Wool heavily stained Acetate unstained	— Wool and silk heavily stained Acetate unstained	Nylon Silk and wool dyed as cotton Acetate unstained, nylon dyed	OTHER FIBRES Dyeing Staining		
Cellulose: urea process with disodium orthophosphate, only moderate colour yield			PRINTING		
AATCC Direct 4 4 5 — 5–6 — (II) 2 — 3 —	ISO Direct 3 3 4 6 6–7 7 4 5–6 6 3 — 3 —	ISO 3–4 2–3 3 4–5 5–6 6 3 — 3 —	AATCC 5 4–5 5 — 5 — (I) 4–5 — 3–4 —	AATCC (on nylon) — — — — 4 — (III) 4–5 — — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fair — —	Neutral and alkaline: poor — —	Nylon: with zinc formalde- hyde-sulphoxylate, fairly good–good Yellower and duller Yellower	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		
Leather: see Leather Dyes sec- tion Paper		Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE		

C.I. Direct Brown 110—115

C.I. Direct Brown	110	111	112
CHEMICAL CLASS	Stilbene	Trisazo	Disazo
C.I. CONSTITUTION NUMBER			29166
HUE: Daylight	Bright Reddish Brown (Direct)	Reddish Brown (Direct and 8)	Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fair — Good 6	Normal — Good — Good 8	Normal B Fair 80–100 Good 4
OTHER FIBRES Dyeing	—	—	—
Staining	Silk and wool dyed much lighter than cotton. Acetate and nylon unstained	Silk and wool heavily stained Acetate and nylon heavily stained	Silk and wool dyed much lighter than cotton. Acetate slightly stained, nylon stained
PRINTING			Cellulose: urea process with addition of disodium orthophosphate
FASTNESS PROPERTIES Method	AATCC	AATCC AATCC Direct (8)	AATCC ISO ISO Direct Direct (4)
Acid (organic)	5	5 5	4 3
Alkali	2	3 4	2 3
Hot pressing	3	5 5	4 4 5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	3 4	— 6–7 6
normal	6	4 5	7 7 6–7
2 × normal	—	4 6	— 7 6–7
Washing — alteration	(I) 3*	(I) 3–4 (II) 4	(II) 2 3–4 3–4
staining	—	— —	— 2–3 3
Water — alteration	2	4 5	3–4 3–4 4–5
staining	—	— —	— 1–2 4–5
	*improved by aftertreatment 6		
OTHER PROPERTIES Dischargeability	Neutral: fair	Neutral: good—very good	Neutral and alkaline: fair
Effect of metals — Copper Iron	Unaffected Yellower and duller	Trace yellower Yellower	Unaffected Yellower
NOTES AND NON-TEXTILE USAGE		Leather: occasional use on chrome tannage	Leather: see Leather Dyes section Paper: beater dyeing Heavy metal salts have pigment usage

113	114	115	C.I. Direct Brown
			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Brown	Reddish Brown	Brown→Reddish Brown	HUE: Daylight
Normal B — 80 — —	Normal C — — —	Normal B — 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool dyed lighter than cotton. Acetate unstained, nylon practically unstained	— Silk and wool dyed lighter than cotton Acetate slightly stained	— Silk dyed much lighter, and wool lighter and yellower, than cotton. Acetate unstained	OTHER FIBRES Dyeing Staining
		Cellulose: urea process with addition of disodium orthophosphate Wool and silk: normal methods	PRINTING
ISO 3 4 3 5 5-6 6 4 — 4 —	ISO 5 3-4 4 5 6 7 2 — 2-3 —	AATCC ISO — 3-4 — 4-5 4 3 — 5-6 6 6 — 6-7 (I) 3 3-4 — — — 3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Alkaline: fair Slightly affected Somewhat affected	Good — —	Neutral: fair—fairly good Alkaline: fair Slightly affected Slightly affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Paper: beater dyeing Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 116—121

C.I. Direct Brown	116	117	118
CHEMICAL CLASS		Stilbene	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Reddish Brown Artificial light: redder	Brown	Dull Reddish Orange→Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — Very good 5	Normal — — 100 Fairly good—good —	Normal C — 100 — 4
OTHER FIBRES Dyeing	—	—	—
Staining	Silk dyed much lighter, wool lighter and yellower, than cotton. Acetate slightly stained	Wool and silk dyed equal to cotton Acetate unstained	Silk and wool heavily stained, yellower than cotton Acetate stained
PRINTING	Cellulose: urea process with addition of disodium orthophosphate Wool and silk: normal methods		Cellulose: concentrated brand applied by the urea process with addition of disodium orthophosphate
FASTNESS PROPERTIES Method	AATCC	ISO	ISO
Acid (organic)	—	4	—
Alkali	—	3-4	—
Hot pressing	3-4	4	5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	6	4
normal	6-7	6-7	4-5
2 × normal	—	7	5-6
Washing — alteration	(I) 2-3	3	4
staining	—	—	3-4
Water — alteration	—	2-3	4-5
staining	—	—	4
OTHER PROPERTIES Dischargeability	Neutral: good Alkaline: fairly good	Neutral and alkaline: poor	Neutral: good Alkaline: fairly good
Effect of metals — Copper Iron	Unaffected Unaffected	— —	— —
NOTES AND NON-TEXTILE USAGE	Paper: beater dyeing Leather: see Leather Dyes section		Paper: beater dyeing

119	120	121	C.I. Direct Brown
Stilbene		Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Orange→Brown	—	Yellowish Brown (7 and 9) Brown (8) Reddish Brown (10)	HUE: Daylight
Normal C — 100 — 4	This C.I. Generic Name is no longer in use. Dyes originally listed may be found under C.I. Direct Brown 95	Normal C — 100 — 7, 8, 9, 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk dyed somewhat lighter than cotton. Wool heavily stained. Acetate unstained		— Silk and wool dyed lighter than cotton Acetate stained	OTHER FIBRES Dyeing Staining
Cellulose: concentrated brand applied by the urea process with addition of disodium orthophosphate		Cellulose: for dischargeable grounds	PRINTING
AATCC Direct 4 3-4 5 5-6 6 — (II) 2 4 —	ISO Direct 3 5 4 5-6 6 6-7 4 4 —	ISO (7) 2 2 4 1 2 3 3 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fair — —		Coupled (7) (8) (9) (10): neutral, good—very good; alkaline, poor Unaffected Slightly affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper: beater dyeing			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 122—126

C.I. Direct Brown	122	123
CHEMICAL CLASS	Trisazo	Disazo
C.I. CONSTITUTION NUMBER		
HUE: Daylight	Dull Orange→Reddish Brown (7, 8, 9, 10)	Reddish Brown (8)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — 100 — 7, 8, 9, 10	Normal — Good — Good 8
OTHER FIBRES Dyeing Staining	— Silk dyed yellower and wool lighter than cotton Acetate unstained (developed 8 and 10) and stained (developed 9)	Silk: with acetic acid Wool dyed equal to cotton, silk heavier. Acetate heavily stained, nylon dyed
PRINTING		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (8) 4 3 5 — 2-3 — (II) 4 5 — ISO (7) 3-4 4 4 1 2 3 3-4 — — ISO (8) 4 3 5 1 2 3 4 4 — ISO (9) 4-5 3 5 1 2 3 4 4-5 — ISO (10) 4-5 4 4-5 3 2 3 3 4-5 —	AATCC (8) 5 3 3 — 2 — (III) 4 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Coupled (7): neutral and alkaline, good Developed (8): neutral, good; alkaline, fairly good Developed (9 and 10): neutral, good-very good; alkaline, fairly good Unaffected Slightly affected	Neutral: very good Duller Duller
NOTES AND NON-TEXTILE USAGE		Leather: on chrome suedes

124	125	126	C.I. Direct Brown
Polyazo	Disazo	Disazo 29085	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Brown (8)	Dull Reddish Brown (8)	Yellowish Brown (9) Dull Reddish Yellow (10)	HUE: Daylight
Normal — Good — Good 8	Normal — Poor — Good 8	Normal — 60–80 Fair 9, 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool dyed equal to cotton Acetate slightly stained, nylon dyed	— Silk and wool dyed equal to cotton. Acetate heavily stained, nylon dyed	— Silk and wool dyed lighter than cotton Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (8) 2–3 4 4 — 4 — (II) 3 — 4 —	AATCC (8) 5 5 5 — 2–3 — (II) 2–3 — 4–5 —	ISO (9) 3 5 5 2 2 3 4 — 3–4 — ISO (10) 3 4 4 3 3 4 4 — 4–5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Slightly yellower Slightly yellower	Neutral: fair Unaffected Unaffected	Developed (9): neutral, very good; alkaline, fair Developed (10): neutral, very good; alkaline, poor Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: occasional use on chrome tannage		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 127—132

C.I. Direct Brown	127	128	129
CHEMICAL CLASS	Polyazo		Trisazo
C.I. CONSTITUTION NUMBER	35210		
HUE: Daylight	Blackish Brown (reddish) (8) Blackish Brown (yellowish) (9)	—	Brown→Reddish Brown (7) (8) (9) (10)
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	—	C
Exhaustion	—	—	—
Temp. of maximum affinity °C	100	—	100
Levelling	Fair	Good	—
Suitable aftertreatment	8, 9	9	7, 8, 9, 10
OTHER FIBRES			
Dyeing	—		—
Staining	Wool dyed lighter than cotton Acetate stained		Wool and silk dyed lighter than cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES			
Method	ISO (8) ISO (9)	ISO (9)	ISO (7) ISO (8) ISO (9) ISO (10)
Acid (organic)	5 5	4 4	3-4 2 3 2-3
Alkali	5 5	4 4	3-4 4 3 3
Hot pressing	4-5 4-5	—	4 5 5 4
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	2 2	—	1 1 1 1
normal	2 2	2	2 2 2 2
2 × normal	3 3	—	3 3 3 3
Washing — alteration	3-4 3-4	4	3 3 3 2-3
staining	—	—	—
Water — alteration	3-4 3-4	4-5	5 4-5 4-5 5
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Developed (8) and (9); neutral and alkaline, fairly good		Neutral: good Alkaline: fair
Effect of metals — Copper Iron	Unaffected Unaffected		Unaffected Trace affected
NOTES AND NON-TEXTILE USAGE			

130	131	132	C.I. Direct Brown	
Polyazo		Trisazo 31505	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Dull Reddish Brown (7) (8) (9) (10)	Brown (9)	Reddish Brown (8)	HUE: Daylight	
Normal C — 100 — 7, 8, 9, 10	Normal — — — Good 9	Normal — Good — Good 8	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
— Silk and wool stained Acetate stained		Silk: with Glauber's salt and acetic acid Silk and wool dyed heavier than cotton. Acetate heavily stained, nylon dyed	OTHER FIBRES Dyeing Staining	
			PRINTING	
ISO (7) 4-5 3-4 4 1 2 3 3-4 — 5 —	ISO (9) 3-4 3-4 5 — 2 — 3 — 3-4 —	AATCC (8) 5 3 5 — 1-2 — (II) 2-3 4-5 —	ISO (8) 3 5 5 1 2 3 3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Coupled (7) and Developed (8) (9) (10): neutral, good-very good; alkaline, poor Unaffected Slightly affected	Neutral and alkaline: good — —	Neutral and alkaline: fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
		Leather	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Brown 133—138

C.I. Direct Brown	133	134	135
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Reddish Brown→ Bordeaux (9)	Dull Reddish Brown→ Bordeaux (9)	Brown (9)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good 9	Normal — — — Good 9	Normal — — — Good 9
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (9) 4 5 — — 2 — 3 — 3-4 —	ISO (9) 4 4-5 — — 2 — 3 — 3-4 —	ISO (9) 4 4 — — 3 — 2-3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: very good — —	Neutral and alkaline: very good — —	Neutral and alkaline: very good — —
NOTES AND NON-TEXTILE USAGE			

136	137	138	C.I. Direct Brown
		Trisazo 31500	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown (9)	Dull Yellowish Brown (9)	Reddish Brown (8)	HUE: Daylight
Normal — — — Good 9	Normal — — — Good 9	Normal — Good 80 Fairly good 8, 9, 10	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		— Silk dyed equal to cotton, wool heavier. Acetate and nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (9) 3-4 3-4 — — 2 — 3 — 3-4 —	ISO (9) 4 4 — — 2 — 3 — 3-4 —	AATCC (8) 5 5 5 — 1-2 — (II) 2-3 — 5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: very good — —		Developed (8) (9) (10): neutral and alkaline, fairly good Somewhat weaker Somewhat weaker	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 139—144

C.I. Direct Brown	139	140	141
CHEMICAL CLASS			
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Yellowish Brown (9)	Reddish Brown (7)	Dull Reddish Brown (7)
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal
S.D.C. Classification	—	—	C
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	80–100	100
Levelling	Good	Fair	—
Suitable aftertreatment	9	7	7
OTHER FIBRES			
Dyeing		—	—
Staining		Acetate stained	Acetate stained
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	ISO	ISO
	(9)	(7)	(7)
Acid (organic)	4	3	3
Alkali	4	4	4
Hot pressing	3–4	3	4–5
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	1	1
normal	2	2	2
2 × normal	—	2	2
Washing — alteration	3	4–5	4–5
staining	—	—	—
Water — alteration	3–4	4–5	4
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Neutral and alkaline: good	Neutral and alkaline: fairly good	Neutral and alkaline: fairly good
Effect of metals — Copper	—	Slightly affected	Slightly affected
Iron	—	Unaffected	Unaffected
NOTES AND NON-TEXTILE USAGE		Leather: see Leather Dyes section	

142	143	144	C.I. Direct Brown
			CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Brown→ Blackish Brown (7)	Reddish Brown (7)	Dull Reddish Brown (7)	HUE: Daylight
Normal C — 100 — 7	Normal — — 80–100 Very good 7	Normal — — 60–100 Good 7, 8, 10, 11	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate stained	— Acetate stained	— Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (7) 4 3 4 1 2 2 4–5 — 4 —	ISO (7) 4 4–5 4–5 1–2 2 2 4 — 3–4 —	ISO (7) 4–5 4–5 5 2 2 3 4–5 — 4–5 — ISO (8, 10, 11) 4–5 4–5 4–5 1 2 2–3 4–5 — 4–5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: fairly good Slightly affected Slightly affected	Neutral: fairly good Alkaline: fair — —	Aftertreated 7: neutral, good–very good; alk. fairly good Aftertreated 8: neutral and alk., fair Aftertreated 10 and 11: neutral and alk., good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 145—150

C.I. Direct Brown	145	146	147
CHEMICAL CLASS		Disazo	Disazo
C.I. CONSTITUTION NUMBER		25260	23360
HUE: Daylight	Dull Reddish Brown (7)	Brown (7)	Dull Orange→Brown (7)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 80 — 7	Normal — — — — 7	Normal — — 100 Fair 7
OTHER FIBRES Dyeing Staining	— Acetate stained		
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (7) 5 4 2 2 3 3 4 — 4-5 —	ISO (7) 2 5 4 — 1 — 3 — 3 —	ISO (7) 2 3 4 2 3 3 3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: good Slightly affected Unaffected	Good — —	Neutral: good Alkaline: fairly good Little yellower Little yellower
NOTES AND NON-TEXTILE USAGE	Leather		

148	149	150	C.I. Direct Brown
Disazo 25265	Polyazo 36310	Polyazo 36311	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown (7)	Dull Reddish Brown (7)	Reddish Brown (7)	HUE: Daylight
Normal — Fair 100 Fair 7	Normal — — 60-100 Good-very good 7	Normal — — 40-100 Good 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed equal to cotton. Acetate slightly stained, nylon dyed	— Acetate stained	— Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO (7) 3 4 4 2 2 3 3 — —	ISO (7) 4-5 3 5 2 3 4 4-5 — 4-5 —	ISO (7) 4-5 4-5 4-5 2 2 2-3 4 — 3-4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good-very good Alkaline: good Somewhat yellower Somewhat yellower	Neutral: good Alkaline: fairly good — —	Neutral: good Alkaline: fairly good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 151—156

C.I. Direct Brown	151	152	153
CHEMICAL CLASS	Trisazo	Disazo	Trisazo
C.I. CONSTITUTION NUMBER	31685	25370	31510
HUE: Daylight	Dull Reddish Brown (7)	Reddish Brown (7)	Dull Reddish Brown (7)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Fair 100 — 7	Normal — Very good — Good 7	Normal — — — — 7
OTHER FIBRES Dyeing Staining	— Silk and wool dyed equal to cotton. Acetate heavily stained, nylon dyed	— Acetate stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC (7) 5 5 5 — 3-4 — (II) 2-3 — 5 —	ISO (7) 4 4-5 4 2 2 3 3 — 4 —	ISO (7) 3-4 5 4 — 3 — 3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good—very good Alkaline: fairly good—good Little weaker Little yellower	Neutral: good—very good Alkaline: fairly good Unaffected Unaffected	Good — —
NOTES AND NON-TEXTILE USAGE	Leather: occasional use on chrome tannage		

154	155	156	C.I. Direct Brown
Trisazo 30120	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown (Direct)	Dull Reddish Brown (7)	Dull Brownish Olive (7) Yellower (3)	HUE: Daylight
Normal — — 100 Good 2, 7	Normal — — 40 Very good 7	Normal B — 60 — 3, 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Wool and silk: neutral or acid dye bath Silk and wool dyed lighter than cotton Acetate slightly stained		— Acetate stained	OTHER FIBRES Dyeing Staining
Wool and silk: normal methods			PRINTING
ISO Direct 4 4 4-5 2 2-3 2-3 2-3 — 2-3 —	ISO (2) 4 4-5 — 2 2-3 3 — — — —	ISO (7) 4-5 4-5 4-5 3-4 4 4-5 4-5 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
ISO (3) 4 2-3 3 2 3 4-5 3-4 — 4 —	ISO (7) 4-5 4-5 4-5 3-4 4 4-5 4-5 — 4-5 —	ISO (7) 4 2-3 3 2 3 4-5 3-4 — 4 —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Direct: neutral, very good; alkaline, good. Aftertreated (2): neutral and alkaline, fairly good. Coupled (7), neutral, very good; alkaline, fairly good — —	Good — —	Direct and Coupled (7): neut- ral and alkaline, good Aftertreated (3): neutral and alkaline, fair Somewhat affected Somewhat affected	NOTES AND NON-TEXTILE USAGE
Leather Paper			

C.I. Direct Brown 157—162

C.I. Direct Brown	157	158	159
CHEMICAL CLASS		Trisazo	Trisazo
C.I. CONSTITUTION NUMBER		30070	31755
HUE: Daylight	Reddish Brown (3)	Brown (Direct)	Brownish Olive
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — Good—very good 3	Normal — — 100 Good 2, 7	Normal — — 60–80 Good—very good 7
OTHER FIBRES Dyeing	—	—	—
Staining	Silk dyed redder and wool lighter than cotton Acetate slightly stained	Acetate stained	Acetate stained
PRINTING	Cellulose: urea process with addition of disodium ortho-phosphate	Silk: direct prints	
FASTNESS PROPERTIES Method	AATCC (3)	ISO (3)	ISO (7)
Acid (organic)	3	4	4–5
Alkali	3	3	4
Hot pressing	5	5	4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	4–5	2
normal	5–6	5–6	3
2 × normal	—	6	3
Washing — alteration	(III) 3–4	4	4
staining	—	—	—
Water — alteration	5	5	4–5
staining	—	—	—
OTHER PROPERTIES Dischargeability	Good—very good	Direct: neutral and alkaline, very good. Aftertreated (2): neutral and alkaline, fairly good Coupled (7): neutral, very good; alkaline, fairly good	Neutral and alkaline: very good
Effect of metals — Copper	—	—	—
Iron	—	—	—
NOTES AND NON-TEXTILE USAGE			

160	161	162	C.I. Direct Brown
Trisazo	Trisazo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown (2)	Brown (4)	Reddish Brown (4)	HUE: Daylight
Normal B — — — 2	Normal C — — — 4	Normal C — — — 4	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool and silk dyed heavier than cotton Acetate heavily stained	— Silk dyed equal to cotton, wool lighter Acetate stained	— Silk and wool dyed lighter than cotton Acetate stained	OTHER FIBRES Dyeing Staining
	Cellulose: conc. brand applied by urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent. Prints are steamed and aftertreated with a copper salt	Cellulose: conc. brand applied by urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent. Prints are steamed and aftertreated with a copper salt	PRINTING
ISO (2) 5 4 4 4 4-5 5-6 3-4 — 4-5 —	AATCC (4) 1 3 5 — 5-6 — (III) 3-4 — 5 —	ISO (4) 1 4 3 3 5 6 4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor — —	Neutral: fairly good Alkaline: good — —	Neutral: fairly good Alkaline: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 163—168

C.I. Direct Brown	163	164	165
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER			22045
HUE: Daylight	Blackish Brown	Reddish Brown	Brown (7)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 100 — 4	Normal C — — — 4	Normal — — — — 7
OTHER FIBRES Dyeing Staining	— Silk dyed equal to cotton, wool lighter Acetate unstained	— Silk dyed somewhat lighter than cotton, wool heavier and duller Acetate stained	
PRINTING	Cellulose: conc. brand applied by urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent. Prints are steamed and aftertreated with a copper salt	Cellulose: by urea process with NaOH, Na ₂ HPO ₄ and a hydro-tropic agent. The prints are steamed and aftertreated with a copper salt	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	AATCC (4) 3 3 5 — 4 — (III) 4 — — 5 —	ISO (4) 3 2-3 3 4 4 4-5 — 4 4 — 5 —	ISO (7) 3-4 5 4 — 3-4 — 2-3 — 3-4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fair Alkaline: good — —	Neutral: fair Alkaline: fairly good — —	Good — —
NOTES AND NON-TEXTILE USAGE			

166	167	168	C.I. Direct Brown
Trisazo 31515	Disazo 22770	Disazo 22790	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown→Reddish Brown (7)	Yellowish Brown (3)	Blackish Brown (3)	HUE: Daylight
Normal C — 60 — 7 —	Normal — — 100 — 3	Normal — — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton. Acetate stained, nylon dyed			OTHER FIBRES Dyeing Staining
			PRINTING
ISO (7) 4 5 4 2 2 3 3-4 — 3 —	ISO (3) 3-4 5 4 6 6-7 7 4 — 5 —	ISO (3) 2 3-4 4 5-6 6-7 7 4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Alkaline: fairly good Weaker Weaker	Neutral: poor Alkaline, with anthraquin- one: fair Unaffected Unaffected Sensitive to hard water	Neutral: moderate Alkaline, with anthraquin- one: fairly good—good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: occasional use on chrome tannage Heavy metal salts have pig- ment usage for surface colour- ing paper			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown	169	170	171
CHEMICAL CLASS			Trisazo
C.I. CONSTITUTION NUMBER			30040
HUE: Daylight	Dull Yellowish Orange→ Brown (3) and (4)	Reddish. Brown (3) and (4)	Reddish Brown (7)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 60–70 — 3, 4	Normal C — 40–100 — 3, 4	Normal — — 100 Good—very good 7
OTHER FIBRES Dyeing	—	—	—
Staining	Silk dyed lighter, wool greener and duller than cotton. Acetate and nylon stained	Acetate slightly stained, nylon stained	Acetate stained
PRINTING			
FASTNESS PROPERTIES Method	AATCC (3)	ISO (3)	ISO (7)
Acid (organic)	—	4–5	4
Alkali	—	4	4
Hot pressing	5	4–5	4–5
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	5–6	5–6
normal	7	6	6
2 × normal	—	6–7	6–7
Washing — alteration	(II) 5	4–5	4–5
staining	—	—	—
Water — alteration	5	5	5
staining	—	—	—
OTHER PROPERTIES Dischargeability	Aftertreated (4): alkaline with anthraquinone, good	Aftertreated (4): alkaline with anthra- quinone, good	Neutral: fairly good Alkaline: fair
Effect of metals — Copper Iron	Affected Affected Sensitive to hard water	Slightly affected Affected	— —
NOTES AND NON-TEXTILE USAGE	Leather		

172	173	174	C.I. Direct Brown
	Trisazo 30165		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Yellowish Brown (3)	Reddish Brown (Direct) Brown (3 and 4)	Dull Brown (7)	HUE: Daylight
Normal — — — Good—very good 3	Normal — Good 100 Poor 3, 4	Normal C — — — 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed lighter than cotton Acetate stained	— Silk and wool dyed heavier than cotton Acetate stained		OTHER FIBRES Dyeing Staining
	Cellulose: direct prints		PRINTING
AATCC (3) 5 4 4-5 — 6 — (II) 5 4 —	AATCC Direct (4) 5 2-3 5 — 5-6 — (I) 2 4 —	ISO (3) 3 3-4 4-5 5 6 6-7 4 — 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/3-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Fair — —	Aftertreated (3 and 4): neutral and alkaline, good Yellower and lighter Little duller	Neutral and alkaline: very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Paper: occasional use for beat- er dyeing and surface coating		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 175—183

C.I. Direct Brown	175	176	177
CHEMICAL CLASS	Trisazo	Trisazo	
C.I. CONSTITUTION NUMBER	30150		
HUE: Daylight	Brown (4)	Brownish Grey→ Reddish Brown (4)	Brown (3 and 4)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — 80 — 4	Normal C — — — 4	Normal C — 100 — 3, 4
OTHER FIBRES Dyeing Staining	— Silk and wool dyed yellower than cotton Acetate unstained	— Silk and wool dyed lighter than cotton Acetate stained	— Wool unstained Acetate and nylon stained
PRINTING	Cellulose: conc. brand applied by urea process with NaOH, Na ₂ HPO ₄ and a hydrotropic agent. Prints are steamed and aftertreated with a copper salt		
FASTNESS PROPERTIES Method	AATCC ISO (4) (4)	AATCC ISO (4) (4)	AATCC AATCC ISO ISO (3) (4) (3) (4)
Acid (organic)	2 1	2 1	3 3
Alkali	3 3	4 4	3-4 3
Hot pressing	5 3	5 2	5 5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	— 5	— 4	— — 4-5 4-5
normal	5-6 5-6	4-5 5	5 4 5-6 5-6
2× normal	— 6-7	— 6	— — 6-7 6-7
Washing — alteration	(III) 4 4-5	(III) 4 4	(III) 3-4 (III) 4-5 4-5 5
staining	— —	— —	— — — —
Water — alteration	5 5	5 5	4-5 5 5 5
staining	— —	— —	— — — —
OTHER PROPERTIES Dischargeability	Neutral: fairly good Alkaline: good—very good	Neutral: fair Alkaline: good—very good	Aftertreated (4): alkaline with an- thraquinone, good
Effect of metals — Copper Iron	— —	— —	Slightly affected Affected
NOTES AND NON-TEXTILE USAGE			

178	179	180—183	C.I. Direct Brown
	Disazo 21575		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Dull Reddish Brown (3 and 4)	Dull Reddish Brown	—	HUE: Daylight
Normal C — 100 — 3, 4	Ergan Soga Method*	Ergan Soga Method (See C.I. Direct Brown 179)	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate slightly stained, nylon stained			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC (3) 4 4-5 5 — 5-6 — (II) 3-4 — 4-5 —	AATCC (4) 3 4-5 5 — 5 — (III) 4-5 — 4-5 —	ISO (3) 4 4-5 5 5-6 6 7 5 — 5 —	ISO (4) 3 4-5 5 5-6 6 7 5 — 5 —
Aftertreated (4): alkaline with an- thraquinone, good Slightly affected Affected			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	*Used in Indonesia for dyeing cotton by the Batik wax resist process. Dyed cold in the pres- ence of a chromium salt (chrome oxalate-sulphate complex) followed by after- treatment with alkali (lime) to complete salt formation when it is fast to boiling water		NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 184—190

C.I. Direct Brown	184	185	186
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER	21500	22855	22775
HUE: Daylight	Brown (7)	Reddish Brown	Dull Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Used in Indonesia for dyeing cotton by the Batik, wax resist process — — 7	Applied by the Chrome Soga method developed in Indonesia for dyeing cotton by the Batik, wax resist process. Dyed cold and aftertreated with chromium fluoride, it is fast to boiling water	Applied by the Chrome Soga method developed in Indonesia for dyeing cotton by the Batik, wax resist process. Dyed cold and aftertreated with chromium fluoride, it is fast to boiling water
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{4}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining			
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron			
NOTES AND NON-TEXTILE USAGE			

187, 188	189	190	C.I. Direct Brown
	Polyazo	Trisazo 31750	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Dull Yellowish Red Reddish Brown (6)	Reddish Brown (Direct)	HUE: Daylight
Chrome Soga method (See C.I. Direct Brown 185)	Normal — Good — Good 6	Normal — Fairly good — Good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool dyed much lighter than cotton. Acetate unstained, nylon heavily stained	— Silk and wool dyed equal to cotton. Acetate slightly stained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
	AATCC (6) 5 3 5 — 1-2 — (II) 4 5 —	AATCC Direct AATCC (6) 3 3 5 5 3 3 — — 2 2 — — (II) 2 (II) 3 — — 2 3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Not dischargeable Unaffected Duller	Neutral: good Duller Little duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather: occasional use on chrome tannage	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 191—196

C.I. Direct Brown	191	192	193
CHEMICAL CLASS	Monoazo		
C.I. CONSTITUTION NUMBER	13220		
HUE: Daylight	Reddish Brown	Reddish Brown	Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Padding* — — — — 7		
OTHER FIBRES Dyeing Staining	— —		
PRINTING	Cellulose; suitable for discharge styles		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining	ISO (7) 5 5 4 — 4 — 4-5 — 5 —		
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: good — —		
NOTES AND NON-TEXTILE USAGE	*By padding from an alkaline solution containing ammonia and Glauber's salt, then drying in hot air and finally coupling	Leather: see Leather Dyes section	Leather: see Leather Dyes section

194	195	196	C.I. Direct Brown	
Azo	Polyazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER	
Reddish Brown Artificial light: redder	Dull Orange→Orange Brown	Brownish Olive	HUE: Daylight	
Normal — — — 2, 3	Normal B Good — — —	Normal — Moderate 95–100 Good 2, 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	
	Silk: neutral dyebath Wool and silk heavily stained Acetate slightly stained, nylon dyed	Acetate unstained	OTHER FIBRES Dyeing Staining	
	Cellulose: urea process with disodium orthophosphate	Cellulose: urea process with disodium orthophosphate	PRINTING	
ISO (3, on viscose) — — 5 — 6–7 — 5 5 5 4–5	ISO 4 4–5 3–4 — 5–6 — 2–3 — 3 —	ISO Direct 4 2 4 2 3 3–4 4 3 3–4 2	ISO (2) 4 2 4 4 5 5 4 4 3–4 3–4	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: very good — —	Neutral: very good Alkaline: good Practically unaffected Practically unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	
	Paper: beater dyeing	Leather Paper	NOTES AND NON-TEXTILE USAGE	

C.I. Direct Brown	197	198	199
CHEMICAL CLASS	Trisazo	Polyazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Reddish Brown	Yellowish Brown Artificial light: yellower	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Good 100 Good 2, 3	Normal C Good 95 Poor 3	This C.I. Generic Name is no longer in use
OTHER FIBRES Dyeing	—	—	
Staining	Acetate stained	Acetate stained, nylon heavily stained	
PRINTING	Cellulose: urea process with disodium orthophosphate		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{4}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 4 2-3 4 2 2-3 3 3-4 2-3 4 2-3 4	ISO (2) 4 2-3 4 6 6-7 7 4-5 3-4 4 4-5 5 5	
OTHER PROPERTIES Dischargeability	Neutral: very good Alkaline: very good	Poor	
Effect of metals — Copper Iron	Practically unaffected Practically unaffected	— Considerably affected	
NOTES AND NON-TEXTILE USAGE	Leather Paper	Covers dead cotton and irregu- lar quality viscose yarn Leather: on chrome tannage aftertreated 3	

200	201	202	C.I. Direct Brown
Azo	Polyazo	Trisazo 34035	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Brown Artificial light: yellower	Dark Brown	Dull Yellowish Red	HUE: Daylight
Normal B Good 100 Very good 3, 4		Normal A Very good 80 Good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate and nylon slightly stained		— Acetate slightly stained	OTHER FIBRES Dyeing Staining
Cellulose: urea process with disodium orthophosphate			PRINTING
ISO Direct 2 5 4 5 6 7 4 3-4 — —	ISO (4) 3-4 5 5 5-6 6-7 7 5 4-5 — —	ISO Direct 4 3 4 6 6-7 6-7 2 2-3 3-4 1-2	ISO (5) — — 4-5 — 6 — 4 3-4 4-5 4-5
Direct: neutral, good Slightly affected Unaffected		Neutral: very good Alkaline: very good Unaffected Unaffected Slightly sensitive to hard water	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Leather: see Leather Dyes section		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 203—208

C.I. Direct Brown	203	204	205
CHEMICAL CLASS	Trisazo	Disazo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Reddish Brown	Dull Reddish Brown	Reddish Brown
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Very good 100 Poor 2, 3	Normal B Fair 80 Fair 2, 3	With 2-3% soda ash at 40-100°C — — — Very good 2, 3
OTHER FIBRES Dyeing	—	—	—
Staining	Acetate heavily stained	Acetate heavily stained	Acetate slightly stained
PRINTING	Cellulose: urea process with disodium orthophos- phate		
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) 5 3-4 4 5 5-6 6-7 5 5 5 5	ISO (3) 4-5 4 4 6-7 7 7 4-5 4-5 5 4-5	ISO (3) 4 4 5 4 4-5 5 4 4-5 4-5 5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: good Alkaline: good Trace weaker Unaffected Slightly sensitive to hard water	Neutral: good Alkaline: fairly good Unaffected Unaffected Markedly sensitive to hard water	Neutral: good Alkaline: very good — Slightly duller Slightly sensitive to hard water
NOTES AND NON-TEXTILE USAGE			

206	207	208	C.I. Direct Brown
Disazo 25010	Azo —	Disazo 20080	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown	Reddish Brown	Brown	HUE: Daylight
	Normal — Very good 90-100 Very good 2, 3	Normal — — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Acetate heavily stained		OTHER FIBRES Dyeing Staining
	Cellulose: urea process with disodium orthophosphate		PRINTING
	<div> <div>ISO Direct</div> <div>2-3</div> <div>2</div> <div>4-5</div> <div>2</div> <div>3-4</div> <div>4</div> <div>2-3</div> <div>2</div> <div>4</div> <div>2</div> </div> <div> <div>ISO (2)</div> <div>2-3</div> <div>2</div> <div>4-5</div> <div>4-5</div> <div>5</div> <div>5-6</div> <div>2-3</div> <div>2-3</div> <div>3</div> <div>2-3</div> </div>	<div> <div>ISO Direct</div> <div>—</div> <div>—</div> <div>5</div> <div>—</div> <div>5</div> <div>—</div> <div>4</div> <div>3</div> <div>4</div> <div>3</div> </div> <div> <div>ISO (3)</div> <div>—</div> <div>—</div> <div>5</div> <div>—</div> <div>6-7</div> <div>—</div> <div>5</div> <div>4-5</div> <div>5</div> <div>4</div> </div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: very good Alkaline: very good Slightly affected Slightly affected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: see Leather Dyes section			NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown	209	210	211
CHEMICAL CLASS			Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Dull Reddish Brown	Brown	Brownish Olive Artificial light: yellower
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 90 Good 5	Normal B Good 70 Good 5	Normal — — — — 3
OTHER FIBRES Dyeing Staining	— Acetate and polyester unstained	— Acetate and polyester unstained	
PRINTING	Cellulose: urea process with disodium orthophosphate	Cellulose: urea process with disodium orthophosphate	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 4-5 4 4-5 6-7 7 7-8 4-5 4-5 3-4 2 ISO (5) 4-5 4 4-5 — 3-4 — 4-5 5 4-5 5	ISO Direct 4-5 4-5 4-5 7 7 7-8 4-5 4-5 3-4 2 ISO (5) 4-5 4-5 4-5 — 3-4 — 4-5 5 4-5 5	ISO (3, on viscose) — — 5 — 6-7 — 5 4-5 5 4
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: very good — —	Neutral: very good Alkaline: very good — —	
NOTES AND NON-TEXTILE USAGE	Paper: beater dyeing		

212	213	214	C.I. Direct Brown
	Azo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brown	Brown	Reddish Brown	HUE: Daylight
Normal C Good 90 Fair —			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Wool dyed weaker than cotton Acetate unstained, nylon slightly stained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 3-4 3 5 6 6-7 4-5 4-5 4-5 5			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fair Alkaline: fair Unaffected Slightly affected			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: see Leather Dyes section	Leather: see Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Brown 215—218

C.I. Direct Brown	215	216	217
CHEMICAL CLASS	Tetratisazo	Trisazo	Azo
C.I. CONSTITUTION NUMBER	35720		
HUE: Daylight	Dull Brown	Brown	
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — Fairly good 95 Good 2, 3, 4, 6, 7, 8	Normal — Fair 90 Poor 3, 4	
OTHER FIBRES Dyeing Staining	Silk: neutral bath with Glauber's salt Acetate slightly stained	Wool and silk: acid dyebath Nylon: acid dyebath Acetate and polyester slightly stained	
PRINTING	Cellulose: urea process with disodium orthophosphate	Cellulose: urea process with disodium orthophosphate	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 3 4-5 4-5 1-2 2 2-3 2-3 3 2-3 —	ISO (4) 4-5 4-5 4-5 — 5-6 — 4-5 4-5 3-4 5	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: very good Considerably redder Considerably redder	Neutral: good Alkaline: good Unaffected Yellower	
NOTES AND NON-TEXTILE USAGE			Leather: see Leather Dyes section

218		C.I. Direct Brown
Polyazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bright Reddish Brown		HUE: Daylight
Normal — Good 95 Good 5		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate stained		OTHER FIBRES Dyeing Staining
Cellulose: direct		PRINTING
ISO Direct 4-5 3-4B 3YD 5 5 5-6 (40°C) 4-5 3 4-5 3-4	ISO (5) — — — — 5 — 4-5 4 4-5 5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Poor Unaffected Unaffected Sensitive to hard water		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Covers dead cotton		NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 1—3

C.I. Direct Black	1	2	3
CHEMICAL CLASS	Trisazo	Trisazo	Disazo
C.I. CONSTITUTION NUMBER	31595	31575	27710
HUE: Daylight	Navy (Direct and 8) Black (9)	Black	Reddish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal — — — — 8, 9	Normal B — — — —	Normal Good 100 Fairly good —
OTHER FIBRES Dyeing Staining	— Silk and wool stained bluish Acetate unstained	— Silk dyed as deep as cotton Wool dyed lighter than cotton. Acetate unstained	Silk Nylon Silk dyed lighter and wool heavier than cotton. Acetate and nylon heavily stained
PRINTING			Nylon: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 2 5 3 — 3 — 1 — 1-2 — —	ISO (8) 3 5 5 — 3 — 2 — 4-5 — —	ISO (9) 3 5 5 — 3 — 1-2 4 — — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and 8: neutral, very good; alkaline, good Coupled 9: neutral, fairly good; alkaline, fair Unaffected Unaffected	Neutral and alkaline: good Affected Unaffected	Cellulose: neutral and alkaline fairly good—good Silk: neutral, good Much redder Duller
NOTES AND NON-TEXTILE USAGE		Paper	Leather: on chrome tannage Vegetable—ivory buttons Reactions on cellulose H ₂ SO ₄ 10%—reddish violet NaOH 10%—brownish

C.I. Direct Black 4—8:1

C.I. Direct Black	4	5	6																																																							
CHEMICAL CLASS	Trisazo	Polyazo																																																								
C.I. CONSTITUTION NUMBER	30245																																																									
HUE: Daylight	Black (Direct and 6), greener (7) Reddish Brown (2)	Black	—																																																							
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 80–100 — 2, 6, 7, 8, 9		This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Black 44																																																							
OTHER FIBRES Dyeing Staining	Wool and silk: neutral Wool and silk dyed to same depth as cellulose. Acetate unstained—yellow stain Nylon dyed																																																									
PRINTING	Cellulose: urea process with Na ₂ HPO ₄ Silk Wool																																																									
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	<table><tr><td>AATCC Direct</td><td>AATCC (6)</td><td>ISO Direct</td><td>ISO (6)</td><td>ISO (7)</td></tr><tr><td>3</td><td>5</td><td>3</td><td>4</td><td>3–4</td></tr><tr><td>3</td><td>3</td><td>3</td><td>4</td><td>4</td></tr><tr><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>4</td><td>2</td><td>3</td><td>2–3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>2</td><td>4</td><td>3</td><td>3</td><td>3–4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (6)	ISO Direct	ISO (6)	ISO (7)	3	5	3	4	3–4	3	3	3	4	4	4	4	4	4	4	—	—	—	—	—	4	3	3	3	3	—	—	—	—	—	3	4	2	3	2–3	—	—	—	—	—	2	4	3	3	3–4	—	—	—	—	—		
AATCC Direct	AATCC (6)	ISO Direct	ISO (6)	ISO (7)																																																						
3	5	3	4	3–4																																																						
3	3	3	4	4																																																						
4	4	4	4	4																																																						
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—	—	—	—	—																																																						
2	4	3	3	3–4																																																						
—	—	—	—	—																																																						
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Cellulose (direct, 2 and 6): neutral, fairly good—good; alkaline, fair—fairly good Cellulose (7): neutral, good; alkaline, fairly good—good Silk (direct): neutral, fair—fairly good Unaffected Unaffected																																																									
NOTES AND NON-TEXTILE USAGE	See Leather Dyes section Paper: beater dyeing	See Leather Dyes section Reactions in substance H ₂ SO ₄ conc.—blue; on diln—brown																																																								

7	8	8:1	C.I. Direct Black
Azo	Trisazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Black	Greenish Black	—	HUE: Daylight
Normal — Good — Good —	Normal — Good — Good —	Slightly different chemically from C.I. Direct Black 8, but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed much lighter than cotton. Acetate and nylon heavily stained	— Silk and wool dyed to same depth as cotton Acetate slightly stained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 3 3 5 — 3-4 — 1 — 2 —	AATCC 2 3 4 — 4 — 3 — 3 —		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good—very good Unaffected Unaffected	Neutral: fairly good Unaffected Unaffected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Reactions in substance H ₂ SO ₄ conc.—dark blue; on diln—reddish blue ppt.	Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—blue, on diln—dark blue ppt. NaOH 10%—reddish blue		NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 9—13

C.I. Direct Black	9	10	10:1
CHEMICAL CLASS	Trisazo	Trisazo	
C.I. CONSTITUTION NUMBER	31560 and 31565*	31545	
HUE: Daylight	Black (Direct)	Black	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 100 — 6	Normal C — — —	Slightly different chemically from C.I. Direct Black 10, but similar in properties and usage
OTHER FIBRES Dyeing Staining	— Silk and wool dyed same depth as cotton Acetate and nylon stained	— Silk dyed somewhat lighter and wool lighter than cellulose. Acetate stained, nylon dyed	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 3 5 4 — 4 — 2 2-3 —	AATCC (6) 4 5 4 — 3 — 4 2-3 —	ISO Direct 4 4-5 4 2-3 3 — 3 4 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and aftertreated: neutral and alkaline, good Unaffected Unaffected	Neutral: very good Alkaline: good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage Paper *The dyes listed under this C.I. Generic Name have the constitution of either C.I. 31560 or C.I. 31565 between which there is only small chemical difference. Pontamine Fast Black FF (DUP) is C.I. 31565	Paper	

11	12	13	C.I. Direct Black
Trisazo 30240		Trisazo 30025	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Black (Direct)	Greenish Black (Direct)	—	HUE: Daylight
Normal — — 80 Fair 2, 6, 7, 8	Normal — — — Good 4, 6, 7, 8, 9	Normal C — — — 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		Silk and wool dyed lighter than cotton Acetate stained	OTHER FIBRES Dyeing Staining
		Cellulose: direct	PRINTING
ISO 3 5 3-4 — 3 — 1-2 — 2 —	Direct (4) ISO (7) (8) (9) 2 3 4 3 4 5 5 5 5 5 3-4 4 4 4-5 4-5 — — — — — 2-3 3 2-3 2-3 2-3 — — — — — 1-2 2 3 2-3 3 — — — — — 2 3 4 3 3 — — — — —	ISO Direct (6) 3-4 4-5 5 5 4 4 2 2 3 3 3-4 3-4 2 3 — — 3-4 4 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good—good Alkaline: fair—fairly good — —	Direct: neutral, good—very good; alk- aline, fairly good—good 8 and 9: neutral and alkaline, good 7: neutral, good; alkaline, fairly good 4: neutral and alkaline, poor — —	Very good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather Paper		NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 14—18

C.I. Direct Black	14	15	16
CHEMICAL CLASS	Trisazo	Disazo	Trisazo
C.I. CONSTITUTION NUMBER	30345	22620	
HUE: Daylight	Bluish Black (Direct) Greenish Black (7)	Navy→Bluish Black (Direct) Black (8 and 9)	Black
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 80-100 — 7	Normal — — — Good-very good 8, 9	— C — — — —
OTHER FIBRES Dyeing Staining	Wool: weak acetic acid Silk and wool dyed to same depth as cellulose. Acetate slightly stained, nylon dyed	— Acetate and silk unstained Wool dyed lighter than cotton	— Silk and wool dyed to same depth as cotton. Acetate stained, nylon dyed
PRINTING	Cellulose: direct	—	
FASTNESS PROPERTIES Method	ISO Direct (7)	ISO Direct (8) (9)	ISO
Acid (organic)	2-3 3	2 4 5	3
Alkali	4-5 4	5 5 5	5
Hot pressing	3-4 4	4 5 5	4
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	2 1	2 — —	1-2
normal	3-4 2	2 2 3	2
2 × normal	4 3	3 3 4	2-3
Washing — alteration	2 2-3	2-3 4 4	2
staining	— —	— — —	—
Water — alteration	2 3	1 4-5 5	3
staining	— —	— — —	—
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct: neutral, good; alkaline, fairly good 7: neutral, good; alkaline, fairly good-good Duller Unaffected	Direct: neutral, good-very good; alkaline, good 8 and 9: neutral, good-very good; alkaline, fairly good-good Somewhat affected Unaffected	Good — —
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage	Leather: see Leather Dyes section	Reactions in substance H ₂ SO ₄ conc.—reddish blue, on diln—blackish violet and ppt.

17	18	C.I. Direct Black																																																																													
Disazo 27700		CHEMICAL CLASS C.I. CONSTITUTION NUMBER																																																																													
Greenish Grey→Greenish Black (Direct) Black (9) Navy (8)	Black (Direct)	HUE: Daylight																																																																													
Normal C Very good 40–80 — 7, 8, 9	Normal — — — — 4, 5, 6, 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment																																																																													
Silk: acetic acid Silk and wool dyed same depth as cellulose Acetate stained, nylon dyed	Silk: neutral Wool dyed same depth as cotton Acetate stained (yellow)	OTHER FIBRES Dyeing Staining																																																																													
		PRINTING																																																																													
<table><tr><td>AATCC Direct</td><td>AATCC (9)</td><td>ISO Direct</td><td>ISO (8)</td><td>ISO (9)</td></tr><tr><td>5</td><td>4</td><td>2</td><td>5</td><td>5</td></tr><tr><td>3</td><td>4</td><td>3–4</td><td>5</td><td>4–5</td></tr><tr><td>3</td><td>3</td><td>3</td><td>5</td><td>5</td></tr><tr><td>—</td><td>—</td><td>2–3</td><td>2</td><td>2–3</td></tr><tr><td>3</td><td>4</td><td>3</td><td>3</td><td>3–4</td></tr><tr><td>—</td><td>—</td><td>3–4</td><td>3–4</td><td>4</td></tr><tr><td>3</td><td>4</td><td>2</td><td>4</td><td>4–5</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>5</td><td>2</td><td>4–5</td><td>4–5</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (9)	ISO Direct	ISO (8)	ISO (9)	5	4	2	5	5	3	4	3–4	5	4–5	3	3	3	5	5	—	—	2–3	2	2–3	3	4	3	3	3–4	—	—	3–4	3–4	4	3	4	2	4	4–5	—	—	—	—	—	3	5	2	4–5	4–5	—	—	—	—	—	<table><tr><td>ISO Direct</td><td>ISO (6)</td></tr><tr><td>2–3</td><td>3</td></tr><tr><td>4</td><td>4</td></tr><tr><td>3–4</td><td>4</td></tr><tr><td>—</td><td>—</td></tr><tr><td>3–4</td><td>3</td></tr><tr><td>—</td><td>—</td></tr><tr><td>1–2</td><td>2–3</td></tr><tr><td>—</td><td>—</td></tr><tr><td>2–3</td><td>3–4</td></tr><tr><td>—</td><td>—</td></tr></table>	ISO Direct	ISO (6)	2–3	3	4	4	3–4	4	—	—	3–4	3	—	—	1–2	2–3	—	—	2–3	3–4	—	—	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
AATCC Direct	AATCC (9)	ISO Direct	ISO (8)	ISO (9)																																																																											
5	4	2	5	5																																																																											
3	4	3–4	5	4–5																																																																											
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3	5	2	4–5	4–5																																																																											
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ISO Direct	ISO (6)																																																																														
2–3	3																																																																														
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—	—																																																																														
2–3	3–4																																																																														
—	—																																																																														
Cellulose: direct, neutral and alkaline, good; 9: neutral, very good; alkaline, good; 8: neutral, very good; alkaline, good–very good Silk (direct): neutral, fairly good Unaffected Unaffected	Neutral: good–very good Alkaline: good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron																																																																													
Leather: on chrome tannage (direct), on chrome suede, developed with 8 or 9	Leather	NOTES AND NON-TEXTILE USAGE																																																																													

C.I. Direct Black 19—22:1

C.I. Direct Black	19	19:1	20																																				
CHEMICAL CLASS	Polyazo		Trisazo																																				
C.I. CONSTITUTION NUMBER	35255		30395																																				
HUE: Daylight	Greenish Black (Direct)	—	Navy→Bluish Black																																				
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Good 80 — 6	Slightly different chemically from C.I. Direct Black 19, but similar in properties and usage	Normal — — — — —																																				
OTHER FIBRES Dyeing Staining	Silk Silk and wool dyed lighter than cellulose Acetate and nylon stained		— —																																				
PRINTING	Cellulose: direct																																						
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: ½—½ normal normal 2× normal Washing — alteration staining Water — alteration staining	<table><tr><td>AATCC</td><td>ISO</td><td>ISO</td></tr><tr><td>Direct</td><td>Direct</td><td>(6)</td></tr><tr><td>4-5</td><td>4</td><td>4</td></tr><tr><td>3</td><td>3</td><td>4</td></tr><tr><td>4-5</td><td>3</td><td>4</td></tr><tr><td>2</td><td>2-3</td><td>—</td></tr><tr><td>3</td><td>3-4</td><td>4</td></tr><tr><td>4</td><td>—</td><td>—</td></tr><tr><td>2-3</td><td>2</td><td>2-3</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>2</td><td>2</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></table>	AATCC	ISO	ISO	Direct	Direct	(6)	4-5	4	4	3	3	4	4-5	3	4	2	2-3	—	3	3-4	4	4	—	—	2-3	2	2-3	—	—	—	2	2	3	—	—	—		ISO 3 5 3-4 — 3 — 1-2 — 2 —
AATCC	ISO	ISO																																					
Direct	Direct	(6)																																					
4-5	4	4																																					
3	3	4																																					
4-5	3	4																																					
2	2-3	—																																					
3	3-4	4																																					
4	—	—																																					
2-3	2	2-3																																					
—	—	—																																					
2	2	3																																					
—	—	—																																					
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Direct and 6: neutral, good; alkaline, fair Slightly greener Unaffected		Neutral: very good Alkaline: fair — —																																				
NOTES AND NON-TEXTILE USAGE	Anodised aluminium Leather: see Leather Dyes section Paper Regenerated-cellulose film Reactions on cellulose H ₂ SO ₄ 10%—much redder NaOH 10%—bluer and brighter																																						

21	22	22:1	C.I. Direct Black																																																						
Trisazo 31580	Polyazo 35435		CHEMICAL CLASS C.I. CONSTITUTION NUMBER																																																						
Black	Greenish Black (Direct)	—	HUE: Daylight																																																						
Normal — — — — —	Normal C Good 100 — 6, 4	Slightly different chemically from C.I. Direct Black 22, but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment																																																						
— Acetate unstained	Silk Bast fibres Silk and wool dyed lighter than cellulose Acetate unstained to stained, nylon stained		OTHER FIBRES Dyeing Staining																																																						
	Cellulose: urea process		PRINTING																																																						
ISO 4 2 5 — 2-3 — 2-3 — 1-2 —	<table><tr><td>AATCC Direct</td><td>AATCC (6)</td><td>ISO Direct</td><td>ISO (4)</td><td>ISO (6)</td></tr><tr><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td></tr><tr><td>4-5</td><td>4</td><td>4</td><td>5</td><td>4-5</td></tr><tr><td>3</td><td>3</td><td>2-3</td><td>4</td><td>2</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>5-6</td><td>5-6</td><td>4</td><td>5</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>4</td><td>3</td><td>3-4</td><td>3-4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>4</td><td>3</td><td>5</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (6)	ISO Direct	ISO (4)	ISO (6)	5	5	5	5	5	4-5	4	4	5	4-5	3	3	2-3	4	2	—	—	—	—	—	5-6	5-6	4	5	4	—	—	—	—	—	3	4	3	3-4	3-4	—	—	—	—	—	3	4	3	5	4	—	—	—	—	—	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
AATCC Direct	AATCC (6)	ISO Direct	ISO (4)	ISO (6)																																																					
5	5	5	5	5																																																					
4-5	4	4	5	4-5																																																					
3	3	2-3	4	2																																																					
—	—	—	—	—																																																					
5-6	5-6	4	5	4																																																					
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3	4	3	3-4	3-4																																																					
—	—	—	—	—																																																					
3	4	3	5	4																																																					
—	—	—	—	—																																																					
Fairly good—good — —	Direct and 6: neutral and alkaline, very good 4: alkaline with anthraquinone, fairly good Somewhat affected Unaffected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron																																																						
	Leather: see Leather Dyes section Paper: coating and beater dyeing Reactions on cellulose H ₂ SO ₄ 10%—unchanged NaOH 10%—bluer		NOTES AND NON-TEXTILE USAGE																																																						

C.I. Direct Black 23—28

C.I. Direct Black	23	24	25
CHEMICAL CLASS		Trisazo	
C.I. CONSTITUTION NUMBER		31925	
HUE: Daylight	Black	Black	Greenish Black Redder when developed with <i>m</i> -phenylenediamine
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	— — — — Good —	Normal — — — — —	Normal A — — — —
OTHER FIBRES Dyeing Staining			
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4 4-5 3-4 — 4-5 — 1-2 — 2-3 —	ISO Direct 4-5 1 4 — 3 — 1-2 — 2-3 —	ISO Direct Developed 1 5 3 3-4 3 5 2 — 3 3-4 4 4-5 1 4 — — 2 5 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: fairly good Alkaline: moderate — —		Direct: neutral and alkaline, very good Developed: neutral, good-very good; alkaline, fairly good- good. Unaffected Slightly greener
NOTES AND NON-TEXTILE USAGE			Dyes irregular quality viscose level

26	27	28	C.I. Direct Black
	Trisazo 31810	Polyazo 35260	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Black	Bluish Black (Direct)	Black (Direct)	HUE: Daylight
Normal C — 40-80 — —	Normal — — 80 Fair 2	Normal — — — Very good 6	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed same depth as cellulose. Acetate unstained, nylon slightly stained	— Silk and wool dyed lighter than cellulose Acetate stained	— —	OTHER FIBRES Dyeing Staining
Cellulose: direct			PRINTING
ISO 3 4 5 2 3 3 3 — 3 —	ISO 4 3 3 — 4 — 1-2 — 2-3 —	ISO Direct (6) 2-3 3-4 5 5 3-4 4 — — 3-4 3-4 — — 1-2 3-4 — — 2-3 3-4 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: fairly good Somewhat affected Somewhat affected	Neutral: good Alkaline: fairly good Unaffected Unaffected Very sensitive to hard water	Direct and aftertreated: neutral, good; alkaline, fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 29—34

C.I. Direct Black	29	30	31
CHEMICAL CLASS	Disazo	Disazo	Azo
C.I. CONSTITUTION NUMBER	22580	23675	
HUE: Daylight	Bluish Grey (Direct) Navy (8) Black (9)	—	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C Fair 100 — 8, 9	Normal — — — — —	Normal — — 60–95 Good 2, 8, 9
OTHER FIBRES Dyeing	—	—	—
Staining	Silk and wool dyed much lighter than cellulose. Acetate stained, nylon slightly stained	—	Silk and wool dyed redder and lighter than cellulose Acetate stained
PRINTING			
FASTNESS PROPERTIES Method	AATCC Direct	AATCC (8 and 9)	ISO Direct
Acid (organic)	3	3	4
Alkali	3	3	4
Hot pressing	3	3	3–4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	—	3
normal	4	4	3–4
2 × normal	—	—	3–4
Washing — alteration	2	3	3
staining	—	—	—
Water — alteration	2	3	3
staining	—	—	—
OTHER PROPERTIES Dischargeability	Direct and 8: neutral, fairly good–good; alkaline, good 9: neutral, good–very good; alkaline, good		Direct and 8 and 9: neutral, good; alkaline, fairly good
Effect of metals — Copper Iron	Redder Unaffected		— —
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage		

32	33	34	C.I. Direct Black
Polyazo 35440	Trisazo	Polyazo 35075	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Black (Direct)	Greenish Black	Greenish Black	HUE: Daylight
Normal — — — 6			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk heavily stained Acetate unstained			OTHER FIBRES Dyeing Staining
			PRINTING
ISO Direct (6) 4 4 4 4 2 4 — — 4 4 — — 3-4 4 — — 4 4-5 — —			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: very good Unaffected Unaffected			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	See Leather Dyes section	Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 35—38:1

C.I. Direct Black	35	36	36:1
CHEMICAL CLASS	Trisazo	Trisazo	
C.I. CONSTITUTION NUMBER		31665	
HUE: Daylight	Greenish Black	Greenish Black	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal C — — — —	— — Good — Good —	Slightly different chemically from C.I. Direct Black 36, but similar in properties and usage
OTHER FIBRES Dyeing Staining	— Silk and wool dyed as deep as cotton Acetate stained	Wool and silk: acetic acid Silk and wool dyed heavier than cotton. Acetate slightly stained, nylon heavily stained	
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 3 3 3-4 2 2-3 3 3-4 — 3 —	AATCC 2 3 1 — 3 — 1 — 1 —	
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Good — —	Neutral: fairly good-good Unaffected Unaffected	
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—blackish violet, on diln—deep reddish grey	Leather: on chrome tannage Paper: coating and beater dyeing	

37	38	38:1	C.I. Direct Black																																																						
Trisazo	Trisazo 30235		CHEMICAL CLASS C.I. CONSTITUTION NUMBER																																																						
Greenish Black	Black (Direct and 6) Greener (7)	—	HUE: Daylight																																																						
Normal — Good — Good — —	Normal C Very good 80 — 2, 6, 7, 8, 9, 10	Somewhat different chemically from C.I. Direct Black 38, but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment																																																						
— Silk and wool dyed much lighter than cellulose Acetate slightly stained, nylon heavily stained	Wool: neutral Silk: neutral Bast fibres Hog's hair Wool and silk dyed as deep but greener than cellulose. Acetate unstained to stained (yel- low), nylon dyed		OTHER FIBRES Dyeing Staining																																																						
Cellulose: direct Silk: direct	Cellulose: urea process Wool and silk: direct		PRINTING																																																						
AATCC 1 3 5 1-2 3 4 1 — 1 —	<table><tr><td>AATCC Direct</td><td>AATCC (6)</td><td>ISO Direct</td><td>ISO (6)</td><td>ISO (7)</td></tr><tr><td>3</td><td>5</td><td>3</td><td>3-4</td><td>4</td></tr><tr><td>3</td><td>3</td><td>3</td><td>3-4</td><td>4</td></tr><tr><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>4-5</td><td>3</td><td>3</td><td>2</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>3</td><td>4</td><td>2</td><td>2-3</td><td>3</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>2</td><td>4</td><td>2-3</td><td>3</td><td>4</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>	AATCC Direct	AATCC (6)	ISO Direct	ISO (6)	ISO (7)	3	5	3	3-4	4	3	3	3	3-4	4	4	4	4	4	4	—	—	—	—	—	4-5	3	3	2	3	—	—	—	—	—	3	4	2	2-3	3	—	—	—	—	—	2	4	2-3	3	4	—	—	—	—	—	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
AATCC Direct	AATCC (6)	ISO Direct	ISO (6)	ISO (7)																																																					
3	5	3	3-4	4																																																					
3	3	3	3-4	4																																																					
4	4	4	4	4																																																					
—	—	—	—	—																																																					
4-5	3	3	2	3																																																					
—	—	—	—	—																																																					
3	4	2	2-3	3																																																					
—	—	—	—	—																																																					
2	4	2-3	3	4																																																					
—	—	—	—	—																																																					
Neutral: fairly good Much redder and weaker Much weaker	Cellulose, direct, aftertreated and coupled: neutral, good; alkaline, fairly good Silk, direct: neutral, fair-fairly good Unaffected Unaffected		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron																																																						
Leather: on chrome tannage Reactions in sub- stance H ₂ SO ₄ conc.—dark red- dish blue, on diln—blue and ppt.	See Leather Dyes section Aqueous inks Biological stain Plastics Vegetable-ivory buttons Wood-flour used as a resin filler Wood stain Reactions in cellulose H ₂ SO ₄ 10%—redder; NaOH 10%—greener		NOTES AND NON-TEXTILE USAGE																																																						

C.I. Direct Black 39—44

C.I. Direct Black	39	40	41
CHEMICAL CLASS	Disazo	Trisazo	Trisazo
C.I. CONSTITUTION NUMBER		31760	30260
HUE: Daylight	Bluish Grey	Grey	Grey→Black
DYEING: CELLULOSE			
Dyeing method	—	—	
S.D.C. Classification	—	—	
Exhaustion	—	—	
Temp. of maximum affinity °C	60	—	
Levelling	Good	Good	
Suitable aftertreatment	—	—	
OTHER FIBRES			
Dyeing	—		
Staining	Acetate stained		
PRINTING			
FASTNESS PROPERTIES			
Method	ISO	ISO	
Acid (organic)	2-3	4	
Alkali	4	4	
Hot pressing	4-5	3-4	
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	2-3	—	
normal	2-3	2	
2 × normal	3	—	
Washing — alteration	2	2	
staining	—	—	
Water — alteration	2	2-3	
staining	—	—	
OTHER PROPERTIES			
Dischargeability	Neutral and alkaline: very good		
Effect of metals — Copper	—		
Iron	—		
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—green, on diln —violet ppt. NaOH—violet		See Leather Dyes section

42	43	44	C.I. Direct Black
		Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	Bluish Black (Direct) Navy (8) Black (9)	Black	HUE: Daylight
	Normal — — Good 8, 9	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Silk and wool slightly stained Acetate unstained	— Acetate slightly stained, nylon dyed. Silk and wool unstained cold, dyed much lighter than cellulose hot	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO Direct (8 and 9) 4 5 4-5 5 3-4 5 2 2 2-3 2-3 3 3 1-2 3 — — 2 4 — —	AATCC 3 3 2-3 — 3 — 2-3 — 3 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Direct: neutral and alkaline, good—very good 8: neutral, good; alkaline, poor 9: neutral, good; alkaline, fair — —	Cellulose and silk: neutral, fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
See Leather Dyes section		Reactions in substance H ₂ SO ₄ conc.—dark blue, on diln—bluish violet ppt. Paper	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 45—50

C.I. Direct Black	45	46	47
CHEMICAL CLASS		Polyazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Black	Reddish Black	Bluish Grey
DYEING: CELLULOSE			
Dyeing method	Normal	—	—
S.D.C. Classification	—	—	B
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	100	—
Levelling	—	Good	—
Suitable aftertreatment	—	—	—
OTHER FIBRES			
Dyeing		—	—
Staining		Acetate stained	Wool dyed heavier and silk lighter than cotton Acetate stained
PRINTING			
FASTNESS PROPERTIES			
Method	AATCC	ISO	ISO
Acid (organic)	4	4-5	4-5
Alkali	3	4-5	5
Hot pressing	2-3	3-4	5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	—	2-3	2
normal	2	3	3
2 × normal	—	3-4	4
Washing — alteration	2-3	4-5	2
staining	—	—	—
Water — alteration	3	5	2-3
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	—	Neutral: very good Alkaline: good-very good	Very good
Effect of metals — Copper	—	—	—
Iron	—	—	—
NOTES AND NON-TEXTILE USAGE		Reactions in substance H ₂ SO ₄ conc.—greenish black, on diln—black ppt. NaOH—violet black	Reactions in substance H ₂ SO ₄ conc.—bluish green, on diln—violet ppt. NaOH—blue

48	49	50	C.I. Direct Black
Trisazo 34000	Trisazo 34155		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Bluish Grey (Direct)	Bluish Grey (Direct)	HUE: Daylight
Normal — — — — —	— — — — 1	— — — — 2	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
ISO 3 5 4 — 3 — 2 3 —	ISO Direct (1) 3 4 4 5 4 5 — — 3 3 — — 2 2 2-3 4 — —	ISO Direct 4-5 5 4 2 3 3-4 2* — 2-3 — *improved by aftertreatment 2	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Very good — —	Direct: very good 1: fair-fairly good — —	Neutral: good-very good Alkaline: good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
		Leather	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 51—56

C.I. Direct Black	51	52	53
CHEMICAL CLASS	Disazo	Trisazo	Polyazo
C.I. CONSTITUTION NUMBER	27720		
HUE: Daylight	Bluish Grey (Direct)	Bluish Grey	Bluish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal A Good 40 — 3	Normal B — — — —	Normal — Good — Good 6
OTHER FIBRES Dyeing Staining	Silk Nylon Silk and wool dyed as deep as cellulose. Acetate slightly stained, nylon dyed	— Silk and acetate unstained Wool heavily stained	— Acetate unstained, nylon slightly stained. Silk and wool dyed much lighter than cellulose
PRINTING	Cellulose: urea process		
FASTNESS PROPERTIES Method	AATCC Direct	ISO Direct	ISO (3)
Acid (organic)	4	2-3	2
Alkali	2	4	4
Hot pressing	5	4	3
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	3	3-4	4
normal	4	4	4
2 × normal	6	5	4-5
Washing — alteration	3	2	3
staining	—	—	—
Water — alteration	1	2	3
staining	—	—	—
		AATCC	ISO
		2	3
		4	4
		5	4
		—	5
		5-6	5-6
		—	6
		3	3
		—	—
		5	3-4
		—	—
			Fastness to washing and water improved by aftertreatment 6
OTHER PROPERTIES Dischargeability	Direct: neutral and alkaline, good —very good. 3: neutral, good; alkaline, very good	Neutral and alkaline: very good	Neutral: very good
Effect of metals — Copper Iron	Somewhat bluer Somewhat bluer Somewhat sensitive to hard water	Unaffected —	Redder Duller
NOTES AND NON-TEXTILE USAGE	See Leather Dyes section Anodised aluminium Furs. Paper: beater dyeing Vegetable-ivory buttons Reactions in substance H ₂ SO ₄ conc.—greenish black, on diln—violet ppt. NaOH—dull violet Reactions on cellulose H ₂ SO ₄ 10%—violet NaOH 10%—bluer	Paper Regenerated-cellulose film	Leather: on chrome tannage Paper: beater dyeing Reactions in substance H ₂ SO ₄ conc.—deep greenish grey, on diln—dull bluish violet NaOH 10%—dull bluish violet

54	55	56	C.I. Direct Black
Polyazo	Trisazo	Trisazo 34170	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	Bluish Grey	Reddish Grey	HUE: Daylight
Normal — Good — Good —	Normal — Good — Good —	Normal B Very good 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained, nylon slightly stained. Silk and wool dyed much lighter than cellulose	— Silk and wool heavily stained Acetate unstained, nylon slightly stained	Silk: neutral Silk dyed much lighter and wool lighter than cellulose. Acetate unstained, nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 3 3 3 — 6 — 2 — 2 — Fastness to washing and water improved by aftertreatment 6	AATCC 4-5 4 5 — 4-5 — 4 — 2 —	AATCC ISO 3 3 5 4 5 4 — 4 5-6 4-5 — 5 3 2-3 — — 4 2-3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Unaffected Duller	Neutral: very good Much duller Much duller	Neutral and alkaline: very good Unaffected Some brands affected Somewhat sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather: on chrome tannage Paper: beater dyeing Reactions in substance H ₂ SO ₄ conc.—grey, on diln— dull reddish navy NaOH 10%—weak reddish grey	Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—dull bluish grey, on diln—dark reddish blue	Leather: on chrome tannage Paper: beater dyeing Regenerated-cellulose film Vegetable-ivory buttons	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 56:1—61

C.I. Direct Black	56:1	57	58
CHEMICAL CLASS		Disazo (metallised)	Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	—	Bluish Grey	—
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Somewhat different chemically from C.I. Direct Black 56, but similar in properties (except that it is sensitive to iron) and usage	Normal — Good — Good —	— — — 100 Fairly good—good —
OTHER FIBRES Dyeing Staining		— Silk and wool heavily stained Acetate and nylon slightly stained	— Silk and wool heavily stained Acetate unstained
PRINTING		Cellulose: direct Silk: direct	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		AATCC 4 1 — — 4-5 — 3 — 3 —	ISO 4 3 4 4-5 5 6 3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral: very good — Appreciably duller	Neutral and alkaline: good — —
NOTES AND NON-TEXTILE USAGE		Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—blue, on diln—violet and black ppt. Reactions on cellulose H ₂ SO ₄ 10%—redder and duller NaOH 10%—bluer and brighter	

59	60	61	C.I. Direct Black
Trisazo	Trisazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Grey	Grey	Bluish Grey	HUE: Daylight
Normal — Fair — Good —	Normal — Good — Good 6	Normal — Good — Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk heavily stained (redder), wool heavily stained. Acetate unstained, nylon stained (pink)	— Silk and wool dyed as deep as cellulose. Acetate heavily stain- ed (yellow), nylon heavily stained	— Acetate unstained, nylon slightly stained. Silk dyed much lighter than cellulose, wool dyed much lighter (redder) than cellulose	OTHER FIBRES Dyeing Staining
		Cellulose: direct Silk: direct	PRINTING
AATCC 5 2 2 — 6 — 3 — 1 — Fast to resin finishing	AATCC 5 5 3 — 6 — 2* — 2* —	AATCC 5 5 5 5-6 — 6-7 2 — 2 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: fairly good Unaffected Redder and duller	Neutral: fairly good Redder Slightly duller	Neutral: fairly good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Reactions in substance H ₂ SO ₄ conc.—dull blue, on diln—bright bluish violet	Leather: on chrome tannage Reactions in substance H ₂ SO ₄ conc.—dull reddish navy, on diln—deep grey and ppt. NaOH 10%—dull navy *Higher when aftertreated with formaldehyde	Reactions in substance H ₂ SO ₄ conc.—blue, on diln— violet	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 62—67

C.I. Direct Black	62	63	64
CHEMICAL CLASS	Stilbene (polyazo)		
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Grey (Direct)	Bluish Grey (Direct)	Reddish Grey
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	—
S.D.C. Classification	B	B	A
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	60–100	—
Levelling	—	—	—
Suitable aftertreatment	4	4	—
OTHER FIBRES			
Dyeing	—	—	—
Staining	Silk and wool dyed much lighter than cotton. Acetate unstained, nylon slightly stained	Wool and acetate unstained Nylon tinted	Silk dyed lighter and wool lighter and greener than cotton. Acetate unstained
PRINTING	Cellulose: direct Wool: direct Silk: direct		
FASTNESS PROPERTIES			
Method	AATCC	ISO	ISO
	Direct	Direct	(4)
Acid (organic)	—	4	5
Alkali	—	4	5
Hot pressing	3–4	3	4
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	—	5–6	5
normal	6	6	5–6
2 × normal	—	6–7	6
Washing — alteration	3–4	3–4	4
staining	—	—	—
Water — alteration	—	3–4	5
staining	—	—	—
	Unaffected by resin finishing		
OTHER PROPERTIES			
Dischargeability	Direct: neutral, fairly good; alkaline, fair 4: alkaline with anthraquinone, fair	Direct: neutral and alkaline, fair Aftertreated: alkaline with anthraquinone, good	Neutral: very good Alkaline: good
Effect of metals — Copper	Unaffected	Slightly affected	—
Iron	Unaffected	Slightly affected	—
NOTES AND NON-TEXTILE USAGE	Paper Leather: see Leather Dyes section		

65	66	67	C.I. Direct Black
		Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	Bluish Grey	Bluish Grey	HUE: Daylight
Normal A — 60-80 — —	Normal B — 60 — —	Normal B Good — — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate unstained in light dyeings	— Acetate unstained in light dyeings	— Silk and wool dyed much lighter than cellulose. Acetate slightly and nylon heavily stained	OTHER FIBRES Dyeing Staining
	Viscose: direct		PRINTING
AATCC ISO 4-5 4-5 4-5 4-5 3-4 4-5 3 3 4 4 4-5 4-5 2 3 — — 2-3 2 — —	ISO 4-5 4-5 5 4 4-5 5 4 — 3-4 —	AATCC ISO 4-5 3 5 — 4-5 4 — 3 5 4 — 4 4-5 2-3 — — 3 2-3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good Slightly affected Somewhat affected	Neutral and alkaline: very good Slightly affected Somewhat affected	Neutral and alkaline: good Greener Weaker, greener and duller	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
See Leather Dyes section Reaction in substance H ₂ SO ₄ conc.—black, on dilm—blue NaOH 5%—dull violet		Leather: see Leather Dyes section Paper: beater dyeing Reaction in substance H ₂ SO ₄ conc.—bluish grey	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 67:1—72

C.I. Direct Black	67:1	68	69
CHEMICAL CLASS		Trisazo	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Grey	Bluish Grey→Reddish Navy	Bluish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Slightly different chemically from C.I. Direct Black 67, but similar in properties and usage	Normal B — — — —	Normal B — 80-100 — —
OTHER FIBRES Dyeing Staining		Cellulose: direct Acetate and silk unstained Wool slightly stained	— Acetate unstained
PRINTING			Viscose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining		AATCC ISO 2 2 3 4 3 3 — 5 5-6 6 — 6 2 3 — — 4 3-4 — —	AATCC ISO 5 4-5 4-5 4-5 5 5 — 5 5 6 — 7 3-4 4 — — 4 3 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron		Neutral and alkaline: very good Unaffected —	Neutral and alkaline: very good Unaffected Slightly affected
NOTES AND NON-TEXTILE USAGE		Paper Regenerated-cellulose film	Reactions in substance H ₂ SO ₄ conc.—dark bluish grey, on diln—reddish blue

70	71	72	C.I. Direct Black
	Disazo 25040		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
—	Bluish Grey	—	HUE: Daylight
This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Direct Black 51	Normal B Good 100 — —	Normal B — 80 — —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	Silk: acetic or formic acid Silk and wool dyed much lighter than cotton. Acetate unstained, nylon heavily stained	— Acetate unstained in light dyeings	OTHER FIBRES Dyeing Staining
	Cellulose: direct	Viscose: direct	PRINTING
	AATCC ISO 3 3 4 5 5 4-5 5-6 5-6 6 6 6-7 6-7 2-3 2-3 — — 4 2-3 — —	AATCC ISO 4-5 4-5 4-5 4-5 4 4-5 3 3 4 3 4-5 4-5 2-3 4 — — 2-3 2-3 — —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: good Alkaline: fairly good-good Unaffected Unaffected Very sensitive to hard water	Neutral: very good Alkaline: good Slightly affected Somewhat affected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: on chrome tannage Paper: coating and beater dyeing Vegetable-ivory buttons Reactions on cellulose H ₂ SO ₄ 10%—slightly bluer NaOH 10%—slightly redder	Reactions in substance H ₂ SO ₄ conc.—greenish black, on diln—blue NaOH 5%—dull violet	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 73—78

C.I. Direct Black	73	74	75
CHEMICAL CLASS	Trisazo	Trisazo	Polyazo
C.I. CONSTITUTION NUMBER		34180	35870
HUE: Daylight	Bluish Grey	Bluish Grey	Bluish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	— — — 80–100 Good —	Normal — Fairly good 100 Good —	Normal — Good 100 Fair —
OTHER FIBRES Dyeing Staining	— Acetate stained	Silk Wool dyed lighter, silk much lighter than cellulose. Acetate unstained Nylon slightly stained	Silk: acetic acid Silk and wool dyed much lighter than cellulose. Acetate and nylon unstained
PRINTING	Cellulose: direct	Cellulose: direct	Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 4–5 4 4–5 4 4–5 5 3–4 — 3–4 —	AATCC ISO 5 4 5 4–5 4 3 — 4–5 5 5 — 5–6 3 2–3 — — 4 2 — —	AATCC ISO 4 5 5 5 3 3–4 — 4–5 5 5 — 5–6 2–3 2 — — 2–3 2 — —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: very good Alkaline: good–very good — —	Neutral and alkaline: good–very good Unaffected Unaffected	Neutral and alkaline: very good Unaffected Unaffected
NOTES AND NON-TEXTILE USAGE	Paper Reactions in substance H ₂ SO ₄ conc.—greenish black, on diln—dull violet	Leather: on chrome tannage Paper: beater dyeing Vegetable–ivory buttons	Leather: on chrome tannage Paper: coating and beater dyeing Soap Vegetable–ivory buttons

76	77	78	C.I. Direct Black
Polyazo 35865	Polyazo 35860	Trisazo 30015	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Brownish Grey	Greenish Grey	Greenish Black (Direct) Black (9) Greenish Navy (8)	HUE: Daylight
Normal — — — — —	Normal — — 100 Fairly good —	Normal C Good 100 — 8, 9	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk —	Silk unweighted and weighted Silk and wool dyed lighter than cotton Acetate stained	Silk, developed dyeings have very good fastness to washing and good fastness to light Wool dyed lighter than cellulose Acetate unstained to stained Nylon heavily stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 3 5 4 4-5 4-5 5 2 — 2-3 —	ISO 5 4 3-4 4-5 5 5-6 2 — 2-3 —	AATCC Direct 1 3 4-5 — 3 — 4 — 4 — AATCC (9) 5 2 5 — 3 — 4 — 5 — ISO Direct 3 3 3 — 5 — 2 — 2 — ISO (8) 5 4 4-5 — 2-3 — 3-4 — 3-4 — ISO (9) 5 4 5 — 3 — 3-4 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: very good Alkaline: good — —	Neutral and alkaline: very good Slightly redder Slightly greener	Direct: neutral, good 8: neutral and alkaline, good-very good 9: neutral and alkaline, good Unaffected Unaffected	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Paper	Paper Plastics	Leather: direct on chrome tannage, de- veloped on chrome suede	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 79—84

C.I. Direct Black	79	80	81
CHEMICAL CLASS		Trisazo	
C.I. CONSTITUTION NUMBER		31600	
HUE: Daylight	Navy (8) Black (9)	Bluish Black (Direct) Black (9) Navy→Bluish Black (8)	Black (8 or 11)
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — — 8, 9	Normal B Good 80–100 — 8, 9	Normal — — — Good–very good 8, 11
OTHER FIBRES Dyeing Staining	— Acetate stained	Silk: acetic or formic acid Silk and wool dyed much lighter than cellulose. Acetate unstained, nylon slightly stained	Silk Wool dyed Acetate unstained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (8) 5 5 5 1 1 1–2 4 — 4–5 —	ISO (9) 5 4 3 1 1–2 1–2 3–4 — 5 —	ISO (8) 4–5 4–5 4–5 — 5 6 3 — 5 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	8 and 9: neutral and alkaline, fairly good–good Unaffected Unaffected	Cellulose, direct: neutral, good–very good; 8 and 9: neutral and alkaline, good–very good Silk, direct: neutral, fairly good Slightly weaker Slightly weaker	Developed 8: neutral and alkaline, very good Developed 11: neutral and alkaline, good–very good — —
NOTES AND NON-TEXTILE USAGE	Reaction in substance H ₂ SO ₄ conc.—reddish blue	Leather: direct on chrome tannage, developed (9) on chrome suede Paper: beater dyeing	

82	83	84	C.I. Direct Black
Trisazo	Trisazo 31850	Disazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey→Black (8 and 9)	Reddish Black (9) Bluish Black (8)	Bluish Black (8 and ethyl- β -naphthylamine*)	HUE: Daylight
Normal B — — — 8, 9	Normal — Good — Good 8, 9	— — — 80–100 Good–very good 8, ethyl- β -naphthylamine	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed much lighter than cellulose Acetate stained	— Silk and wool dyed much lighter than cellulose. Acetate and nylon heavily stained	— Acetate stained	OTHER FIBRES Dyeing Staining
			PRINTING
<div> <div>ISO (8)</div> <div>5</div> <div>4</div> <div>4</div> </div> <div> <div>ISO (9)</div> <div>5</div> <div>4</div> <div>4</div> </div> <div> <div>—</div> <div>3</div> <div>—</div> </div> <div> <div>2–3</div> <div>3</div> <div>—</div> </div>	<div> <div>AATCC (9)</div> <div>5</div> <div>4</div> <div>5</div> </div> <div> <div>ISO Direct</div> <div>3</div> <div>4</div> <div>4</div> </div> <div> <div>ISO (8)</div> <div>3</div> <div>4</div> <div>4</div> </div> <div> <div>2</div> <div>3</div> <div>4</div> </div> <div> <div>3</div> <div>2</div> <div>4</div> </div> <div> <div>—</div> <div>3–4</div> <div>—</div> </div> <div> <div>—</div> <div>—</div> <div>—</div> </div>	<div> <div>ISO (1)</div> <div>4–5</div> <div>4–5</div> <div>4–5</div> </div> <div> <div>ISO *</div> <div>4–5</div> <div>4–5</div> <div>4–5</div> </div> <div> <div>1</div> <div>2</div> <div>3</div> </div> <div> <div>2–3</div> <div>3–4</div> <div>—</div> </div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ – $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Developed 8: neutral and alkaline, very good Developed 9: neutral, very good, alkaline, good — —	Developed (9): neutral, very good Much redder, weaker Redder	Developed (8): neutral, fairly good–good; alkaline, fair–fairly good *Developed: neutral, fairly good, alkaline, fair —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Leather: on chrome tannage	Reactions in substance H ₂ SO ₄ conc.—bluish violet, on diln—blue ppt. NaOH—reddish brown	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 85—90

C.I. Direct Black	85	86	87
CHEMICAL CLASS	Disazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER		24115	24110
HUE: Daylight	Reddish Black (8) Black (ethyl- β -naphthylamine)*	Bluish Black (8)	Bluish Black (8)
DYEING: CELLULOSE			
Dyeing method	—	—	—
S.D.C. Classification	—	—	—
Exhaustion	Good—very good	—	—
Temp. of maximum affinity °C	80–100	—	—
Levelling	Good—very good	—	—
Suitable aftertreatment	8, ethyl- β -naphthylamine	8	8
OTHER FIBRES			
Dyeing	—		
Staining	Acetate stained		
PRINTING			
FASTNESS PROPERTIES			
Method	ISO (8)	ISO (8)	ISO (8)
Acid (organic)	4	5	4
Alkali	4–5	5	5
Hot pressing	4–5	5	5
Light: $\frac{1}{2}$ – $\frac{1}{2}$ normal	1	—	—
normal	2	4	3
2 \times normal	3	—	—
Washing — alteration	4	3	3
staining	—	—	—
Water — alteration	4	3–4	3–4
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Developed (8): neutral, fairly good—good; alkaline, fairly good *Developed: neutral, fairly good; alkaline, fair	Neutral and alkaline: fairly good	Neutral and alkaline: fairly good
Effect of metals — Copper	—	—	—
Iron	—	—	—
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—bluish violet, on diln—blue ppt. NaOH—reddish brown		

88	89	90	C.I. Direct Black
Polyazo	Polyazo	Disazo 21530	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey (3)	Bluish Grey (3)	Black (7)	HUE: Daylight
Normal C — — — 3	Normal C — — — 3	— — — — — 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk slightly stained Wool heavily stained Acetate unstained	Silk heavily stained. Wool dyed (redder) as deep as cellulose Acetate unstained		OTHER FIBRES Dyeing Staining
Cellulose: direct (after cop- pered)	Cellulose: direct (after cop- pered)		PRINTING
AATCC (3) 2 3-4 5 — 4-5 — 4-5 — 5 — AATCC (3) 2 3-4 5 — 4-5 — 4-5 — 5 —	ISO (3) 1 3-4 5 4-5 5 6 4 — 5 — 4 — 5 —	ISO (7) 5 5 4 — 3 — 3 — 4 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: 1/2-1/2 normal normal 2 x normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: very good — —	Neutral: good Alkaline: very good — —	Good — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 91—96

C.I. Direct Black	91	92	93
CHEMICAL CLASS	Trisazo		Trisazo
C.I. CONSTITUTION NUMBER	30400		
HUE: Daylight	Reddish Black (3 and 4)	Reddish Black (3)	Reddish Grey (3)
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	—
S.D.C. Classification	C	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	80	100
Levelling	—	Fair—fairly good	Good—very good
Suitable aftertreatment	3, 4	3	3
OTHER FIBRES			
Dyeing	—	—	—
Staining	Silk and wool dyed lighter than cotton Acetate unstained	Silk and wool dyed lighter than cotton Acetate stained	Acetate stained
PRINTING	Cellulose: direct (after coppered)		
FASTNESS PROPERTIES			
Method	AATCC (3)	ISO (3)	ISO (3)
Acid (organic)	—	4	5
Alkali	—	5	4
Hot pressing	—	5	4
Light: $\frac{1}{2}$ normal	—	—	—
normal	7	6-7	6-7
2 × normal	—	7	—
Washing — alteration	5	4-5	4-5
staining	—	—	—
Water — alteration	—	5	5
staining	—	—	—
		*4 if aftertreated (2)	
OTHER PROPERTIES			
Dischargeability	Alkaline with anthraquinone: good	Neutral: fair—fairly good Alkaline: fairly good—good	Neutral, good—very good Alkaline: very good
Effect of metals — Copper	—	Unaffected	—
Iron	—	Little weaker	—
NOTES AND NON-TEXTILE USAGE	Leather: see Leather Dyes section		Reactions in substance H ₂ SO ₄ conc.—dark blue, on diln—dark blue

94	95	96	C.I. Direct Black
		Disazo 27770	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Grey (3 and 4)	Greenish Black (3)	Bluish Black (7)	HUE: Daylight
Normal B — — — 3, 4	Normal — — 80 Fair—fairly good 3	— — — — Good 7	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Silk and wool dyed much lighter than cotton Acetate unstained	— Silk and wool dyed lighter than cotton Acetate stained		OTHER FIBRES Dyeing Staining
Cellulose: direct (after cop- pered)			PRINTING
AATCC (3) — — 4-5 — 7 — 3-4 — 5 —	ISO (3) (4) 3 4 5 5 6-7 4-5 — 5 —	ISO (7) (3) 3 4 4-5 — 7 — 3-4* 4-5 —	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Aftertreated (2): alkaline with anthraquinone, good — —	Neutral: poor Alkaline: fair Unaffected Little weaker		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 97—101

C.I. Direct Black	97	98	99
CHEMICAL CLASS	Polyazo	Trisazo	
C.I. CONSTITUTION NUMBER	35810		
HUE: Daylight	Bluish Grey (3)	Reddish Black (3)	—
DYEING: CELLULOSE			
Dyeing method	Normal	—	—
S.D.C. Classification	—	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	100	—
Levelling	Very good	Good—very good	—
Suitable aftertreatment	3	3	6
OTHER FIBRES			
Dyeing	—	—	
Staining	Silk and wool dyed much lighter than cellulose Acetate unstained	Acetate stained	
PRINTING	Cellulose: direct (after coppered)		
FASTNESS PROPERTIES			
Method	AATCC (3)	ISO (3)	AATCC (6)
Acid (organic)	—	3	4-5
Alkali	—	3-4	4-5
Hot pressing	4	4-5	3-4
Light: $\frac{1}{2}$ normal	—	5	—
normal	7	6	2
2 × normal	—	6-7	—
Washing — alteration	4-5	5	4
staining	—	—	—
Water — alteration	—	5	4
staining	—	—	—
OTHER PROPERTIES			
Dischargeability	Alkaline with anthraquinone, fairly good	Neutral: fair—fairly good Alkaline: good	
Effect of metals — Copper	—	—	
Iron	—	—	
NOTES AND NON-TEXTILE USAGE	Leather	Reactions in substance H ₂ SO ₄ conc.—green, on diln—bluish black ppt.	

100	100:1	101	C.I. Direct Black
Polyazo 35415		Trisazo 34100	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	—	Bluish Grey	HUE: Daylight
Normal — — — Good —	Slightly different chemically from C.I. Direct Black 100, but similar in properties and usage	Normal — — 90 Good —	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		— Acetate slightly stained	OTHER FIBRES Dyeing Staining
			PRINTING
ISO 4 — 4 2 3 3 3 2-3 3-4 2-3		ISO 4 2 5 5-6 6 6-7 3 3 3 3	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: 4-5 Alkaline: 4 2 5		Neutral: 5 Alkaline: 5 — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 102—107

C.I. Direct Black	102	103	104
CHEMICAL CLASS	Stilbene	Trisazo	Disazo
C.I. CONSTITUTION NUMBER		34179	28685
HUE: Daylight	Brownish Grey Yellower in artificial light	Bluish Grey	Reddish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — — Good, good build up —	Normal — — — Good 5	Normal* — — 40-100 Fair 3
OTHER FIBRES Dyeing Staining	— Acetate unstained Silk heavily stained Wool stained	— Acetate heavily stained Silk stained Wool unstained	— Acetate heavily stained
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO 5 4 2 5-6 6 6-7 4 3-4 4-5 2	ISO ISO Direct (5) 4-5 — 4 — — — 4-5 2 5 3 5-6 3-4 3-4 — — — 3-4 — — —	ISO (3) 4-5 4-5 5 5 5-6 6 4 5 4-5 4-5
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Unsuitable 4-5 4-5	Neutral: 4-5 Alkaline: 4-5 Unaffected — Not sensitive to hard water	Neutral and alkaline: good — Slightly duller Slightly sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage Unsuitable for viscose to be resin finished		*Dyed in alkaline (2-4% soda ash) bath

105	106	107	C.I. Direct Black
Azo	Azo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Greenish Grey Reddish Grey (3)	Bluish Grey (Direct) (3 bluer) Redder in artificial light	Bluish Grey (Direct) (3 duller) Redder in artificial light	HUE: Daylight
— — — — — 3	— — — — — 3	— — — — — 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC Viscose (3) — 5 — 5-6 — 5 4-5 5 4-5	AATCC Viscose (3) — 5 — 5-6 — 5 4-5 5 4-5	ISO Viscose (3) — 5 — 6 — 5 5 5 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
— — — —	— — — —	— — — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black	108	109	110, 111
CHEMICAL CLASS	Azo	Disazo (metallised)	
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Black (Direct) (3 redder) Redder in artificial light	Bluish Grey	
DYEING: CELLULOSE			These C.I. Generic Names are discontinued
Dyeing method	—	Normal	
S.D.C. Classification	—	A	
Exhaustion	—	Very good	
Temp. of maximum affinity °C	—	100	
Levelling	—	Very good	
Suitable aftertreatment	3	—	
OTHER FIBRES			
Dyeing		—	
Staining		Acetate unstained. Acrylic, nylon and polyester slightly and wool heavily stained	
PRINTING			
FASTNESS PROPERTIES			
Method	AATCC	AATCC	
Acid (organic)	—	3	
Alkali	—	3-4	
Hot pressing	5	—	
Light: $\frac{1}{2}$ —1 normal	—	—	
normal	6-7	6	
2 × normal	—	—	
Washing — alteration	5	1-4	
staining	5	—	
Water — alteration	5	3	
staining	4-5	—	
OTHER PROPERTIES			
Dischargeability	—	Neutral: 4 Alkaline: 4	
Effect of metals — Copper	—	—	
Iron	—	—	
NOTES AND NON-TEXTILE USAGE		Urea-formaldehyde finish, hue slightly greener and lessens the light fastness Melamine-formaldehyde fin- ish, hue greener, light fastness considerably lessened Reactions on fibre H ₂ SO ₄ conc.—greenish blue, on diln—greyish violet	

112	113	114	C.I. Direct Black
Trisazo	Disazo	Polyazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	Grey	Black Somewhat redder in artificial light	HUE: Daylight
Normal B Very good 60-90 Good 4, 5	Normal B Very good 95 Very good 4	Normal B Good 80-90 Very good 3	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Silk: acetic acid Acetate and triacetate unstained. Acrylic, polyester and nylon slightly stained	Silk: acetic acid Acetate, triacetate and acrylic unstained. Nylon and polyester slightly stained	— Acetate unstained Nylon heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: direct and discharge	Cellulose: direct		PRINTING
ISO Direct (4) (5) 4 — — 2-3 — — 5 — 5 5-6 — — 6 6 6 6-7 — — 4 5 4-5 3-4 5 3-4 3-4 5 5 2-3 5 5 Fast to resin finishing	ISO Direct (4) (4) 4 — — 3 — — 5 — — 5-6 — — 6 6 6 6-7 — — 4 4-5 3-4 4-5 4 4-5 4 4-5 Fast to resin finishing	ISO (3) 5 4 5 — 6-7 6-7 4 4-5 4-5 4-5 Fast to resin finishing	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: good Alkaline: good Unaffected Unaffected Not sensitive to hard water	Poor Unaffected Unaffected Not sensitive to hard water	Poor — —	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather Paper Reactions in substance H ₂ SO ₄ conc.—navy, on diln—dull violet	Covers viscose of varying affinity Reactions on fibre H ₂ SO ₄ conc.—green HCl dil.—greyish red NaOH dil.—greener		NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 115—120

C.I. Direct Black	115	116	117
CHEMICAL CLASS	Polyazo	Polyazo (copper complex)	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Black Unchanged in artificial light	Bluish Grey Little greener and duller in artificial light	Reddish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 90 Good 6	Normal B Good 90-95 Fair 5	Normal C — — — 4
OTHER FIBRES Dyeing	—	Silk	—
Staining	Acetate and polyester slightly stained. Nylon stained Wool heavily stained	Acetate, acrylic and polyester unstained Nylon and wool stained	Acetate and nylon slightly stained
PRINTING		Cellulose: direct and discharge	
FASTNESS PROPERTIES Method	ISO Direct	ISO Direct	ISO Direct
Acid (organic)	5	4-5	2
Alkali	3-4	2-3	3-4
Hot pressing	5	5	5
Light: $\frac{1}{2}$ normal	—	5	6-7
normal	4	6	7-8
2 × normal	4-5	6-7	7-8
Washing — alteration	4-5	4	3-4
staining	2-3	3	2
Water — alteration	4	4	4-5
staining	4-5	3	4
		Fast to resin finishing	Fast to resin finishing
OTHER PROPERTIES Dischargeability	Neutral: very good Alkaline: very good	Neutral: very good Alkaline: very good	Neutral: 2 Alkaline: 2
Effect of metals — Copper Iron	— —	— —	5 5 Sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Leather: on chrome tannage	Leather: on chrome tannage	

118	119	120	C.I. Direct Black
Azo	Polyazo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey Greener in artificial light	Black	Black	HUE: Daylight
Normal B-C — — 2 4			DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate and nylon unstained			OTHER FIBRES Dyeing Staining
			PRINTING
<div> <div>ISO</div> <div>Direct</div> <div>5</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>7-8</div> <div>5</div> <div>3-4</div> <div>5</div> <div>2</div> <div>Fast to resin finishing</div> </div> <div> <div>ISO</div> <div>(4)</div> <div>5</div> <div>4</div> <div>5</div> <div>5-6</div> <div>7</div> <div>7-8</div> <div>5</div> <div>5</div> <div>5</div> <div>5</div> </div>			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral: 2 Alkaline: 3 5 3-4 Not sensitive to hard water			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Leather	See Leather Dyes section	See Leather Dyes section	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 121—126

C.I. Direct Black	121	122	123
CHEMICAL CLASS	Azo	Azo	Trisazo
C.I. CONSTITUTION NUMBER		36250	
HUE: Daylight	Bluish Black Greener in artificial light	Bluish Grey Unchanged in artificial light	Bluish Black Slightly redder in artificial light
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B — 100 1 3, 4	Normal B Good 90-95 Good 3	Normal B Good 80-100 Good —
OTHER FIBRES Dyeing Staining	— Nylon slightly stained Acetate stained	— Acetate, acrylic and polyester slightly stained Nylon heavily stained	— Acetate unstained, acrylic and polyester slightly and nylon heavily stained. Wool and silk dyed
PRINTING	Cellulose: discharge	Cellulose: direct and discharge	
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO (3) 1 5 5 — 6-7 — 4-5 3 5 5 Fast to resin finishing	ISO (3) 4 3-4 5 5 6 6-7 3-4 4-5 4-5 5	AATCC 1 3-4 4-5 1 2 3-4 3 — 3 —
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	4 (under special conditions) 5 4 Not sensitive to hard water	Good with anthraquinone — —	Neutral: 4 Alkaline: 3-4 Slightly redder Much duller and weaker
NOTES AND NON-TEXTILE USAGE		Leather: aftercoppered on chrome tannage	Effects of resin finishing: Urea-formaldehyde, hue 4, light unaffected Melamine-formaldehyde, hue 4-5, light unaffected Dimethylolethylene urea, hue 4-5, light slightly poorer Reactions in substance H ₂ SO ₄ conc.—blue, on diln—red-dish blue

124	125	126	C.I. Direct Black
Azo	Trisazo	Trisazo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Grey Greener in artificial light	Bluish Grey	Black	HUE: Daylight
Normal B — 90-100 1-2 3, 4	Normal A Fair 80 Good 5	Normal C Good 80 Poor 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
— Acetate slightly stained. Acrylic stained. Nylon heavily stained Silk dyed	— Acetate unstained	Silk: neutral Acetate heavily stained	OTHER FIBRES Dyeing Staining
Cellulose: direct	Cellulose and silk: direct and discharge		PRINTING
<div>ISO (3)</div> <div>2</div> <div>4</div> <div>5</div> <div>5</div> <div>4</div> <div>5-6</div> <div>6-7</div> <div>5</div> <div>5</div> <div>5</div> <div>5</div>	<div>ISO Direct (5)</div> <div>4</div> <div>4-5</div> <div>3-4</div> <div>4-5</div> <div>5-6</div> <div>6</div> <div>2</div> <div>3</div> <div>3-4</div> <div>2-3</div> <div>Fast to resin finishing</div>	<div>ISO Direct (5)</div> <div>5</div> <div>4</div> <div>4</div> <div>—</div> <div>3</div> <div>—</div> <div>2-3</div> <div>1-2</div> <div>4</div> <div>1-2</div> <div>4</div> <div>5</div>	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ - $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Good 1 2	Neutral: good Alkaline: good Unaffected Trace greener and weaker	Neutral: fairly good Alkaline: fairly good — — Not sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Reactions in substance H ₂ SO ₄ conc.—navy, on diln —bluish violet	Reactions in substance H ₂ SO ₄ conc.—navy, on diln —no change	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 127—131:1

C.I. Direct Black	127	128	129
CHEMICAL CLASS	Polyazo	Disazo	Disazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Grey	Bluish Grey	Bluish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Good 100 Poor 3	Normal C Fair 80 Poor 3	Normal B Very good 80 Good 4
OTHER FIBRES Dyeing	—	—	—
Staining	Acetate heavily stained	Acetate slightly stained	Acetate, triacetate, acrylic and polyester unstained Nylon stained
PRINTING	Cellulose: direct and discharge	Cellulose: direct	Cellulose: direct
FASTNESS PROPERTIES Method	ISO (3)	ISO (3)	ISO Direct (4)
Acid (organic)	4-5	3-4	4-5
Alkali	4-5	3	2
Hot pressing	4-5	3	5
Light: $\frac{1}{2}$ normal	5	5	5
normal	6	6	6
2 × normal	6	6-7	6-7
Washing — alteration	4-5	4-5	4
staining	4-5	4	3
Water — alteration	5	5	3-4
staining	5	4-5	2
			Fast to resin finishing
OTHER PROPERTIES Dischargeability	Neutral: fairly good Alkaline: fairly good	Neutral: fairly good Alkaline: fairly good	Neutral: poor Alkaline: good
Effect of metals — Copper Iron	Trace weaker Unaffected Slightly sensitive to hard water	Unaffected Unaffected Slightly sensitive to hard water	Unaffected Unaffected Not sensitive to hard water
NOTES AND NON-TEXTILE USAGE	Reactions in substance H ₂ SO ₄ conc.—greenish blue, on diln—blue	Reactions in substance H ₂ SO ₄ conc.—greenish blue, on diln—reddish navy	Reactions on fibre H ₂ SO ₄ conc.—bluish green, on diln—bordeaux

130	131	131:1	C.I. Direct Black
Azo (metallised)	Trisazo 30270		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey Slightly greener in artificial light	Greenish Navy→Black	—	HUE: Daylight
Normal A Very good 100 Very good —	Very similar in application and properties to C.I. Direct Blacks 8, 37, and 38	Slightly different chemically from C.I. Direct Black 131, but similar in properties and usage	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
Cellulose: direct Acetate, acrylic, polyester unstained Silk slightly stained. Wool and nylon heavily stained			OTHER FIBRES Dyeing Staining
			PRINTING
AATCC 2 1-2 5 — 6 — 5 — 5 —			FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2× normal Washing — alteration staining Water — alteration staining
Neutral and alkaline: very good Very slightly affected Very slightly affected Sensitive to hard water			OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
Effect of urea-formaldehyde finish: light 5, hue 5 Reactions in substance H ₂ SO ₄ conc.—dull blue, on diln—violet			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 132—137

C.I. Direct Black	132	133	134
CHEMICAL CLASS	Disazo	Trisazo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Grey	Bluish Grey	Greenish Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	— B Very good 90 Very good 5	— — — 100 — —	Normal — — — 1 5
OTHER FIBRES Dyeing Staining	Cotton: direct and discharge Acetate and polyester unstained	Silk: acetic acid Nylon stained weak violet Acetate and wool unstained	Silk: acetic or formic acid Acetate and nylon slightly stained. Wool stained grey
PRINTING			
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	AATCC Direct 5 2G 5 7 7-8 7-8 4-5 4 4-5 4 AATCC (5) 5 2G 5 — 5 — 4-5 5 4-5 4-5	ISO Cotton 4-5 4 5 6 6-7 7 2-3 2-3 4 2-3 ISO Silk — — 5 4-5 5-6 6 3-4 4-5 — —	ISO Cotton 5 4Y — 6 6-7 6-7 2 2-3 3-4 2 ISO Silk — — — 4 5 — 3 4-5 4 4
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral and alkaline: very good — — Not sensitive to hard water	Alkaline: fairly good — — Not sensitive to hard water	Cotton: neutral, moderate; alkaline, moderate-fairly good Silk: poor Unchanged Unchanged Slightly sensitive to hard water
NOTES AND NON-TEXTILE USAGE		Resin finishing greens the hue and reduces the light fastness	Hue and fastness to light only slightly changed by resin finishing

135	136	137	C.I. Direct Black
Trisazo	Trisazo	Azo	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Bluish Grey	Grey	Greenish Grey Greener in artificial light	HUE: Daylight
Normal B — — — 5	From NaCl bath A — — — 5	— A Fair 90 Good 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
		— Acetate and wool slightly stained. Nylon and silk heavily stained	OTHER FIBRES Dyeing Staining
Cellulose	Cellulose	Urea: direct (aftercoppered in presence of a cationic dye- fixing agent)	PRINTING
ISO 5 5 — 4 4 4 3-4* 5 — — *improved by cationic after- treatment	ISO 4-5 2-3 — 4 5 5-6 3-4 5 — —	ISO Direct ISO (5) 4-5 — 3 — 4-5 5 6 5 6-7 5-6 6-7 6 3 4-5 5 5 4 5 3 4-5	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
Neutral: moderate Alkaline: poor Seriously affected Affected	Neutral: 5 Alkaline: 4-5 Slight effect Unchanged	Neutral: moderate Alkaline: moderate-good Unaffected Unaffected Not sensitive to hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
	Cationic aftertreatment im- proves fastness to washing but detracts from fastness to light	Reaction in substance H ₂ SO ₄ conc.—reddish grey	NOTES AND NON-TEXTILE USAGE

C.I. Direct Black 138—143

C.I. Direct Black	138	139	140
CHEMICAL CLASS	Azo	Polyazo	Polyazo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Bluish Grey	Bluish Grey	Grey
DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment	Normal B Fair 90 Good 5	Normal — — 60–80 Very good —	Normal B — 100 2 —
OTHER FIBRES Dyeing Staining	Nylon Acetate slightly stained Wool, silk and nylon heavily stained	— Acetate unstained	
PRINTING	Cellulose: direct (aftercoppered in presence of a cationic dye-fixing agent)		Cellulose: direct
FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining	ISO Direct 4–5 3 4–5 5 5–6 6 2–3 5 3–4 3 ISO (5) — — 5 4 4–5 5–6 4 5 5 4–5	ISO 4 4–5 4–5 — 3–4 — 3–4 — 4–5 —	ISO 2/5* 4 — 6–7 7 7–8 4 (40°C) 3 (60°C) 3 2 4 2–3 Resistant to resin finishes
OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron	Neutral: moderate Alkaline: moderate–good Trace clearer Trace greener Somewhat sensitive to hard water	Neutral and alkaline: good — —	Neutral: 3 Alkaline: 2 5 4 Not affected by hard water
NOTES AND NON-TEXTILE USAGE			*acetic acid 30%

141	142	143	C.I. Direct Black
Trisazo 31546	Tetrakisazo (metallised)	Tetrakisazo (metallised)	CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Black	Bluish Grey Unchanged in artificial light	Reddish Grey Unaffected in artificial light	HUE: Daylight
Very similar in properties and usage to C.I. Direct Black 10	Normal B — — 4 5	Normal B — — 4 5	DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Reserve: acetate, 4; wool, 4; nylon, 5; silk, 3	— Reserve: acetate 4-5; wool 4; nylon, 5; silk, 3	OTHER FIBRES Dyeing Staining
			PRINTING
	ISO — 3V 4V 5 6-7 — 3V 3 4 3-4	ISO — 3V 4V 5 6-7 — 3 3 4 3-4	FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: 4 Alkaline: 4-5 4R — Significantly affected by hard water	Neutral: 4 Alkaline: 4-5 4R — Significantly affected by hard water	OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
			NOTES AND NON-TEXTILE USAGE

C.I. Direct Black	144	145	146
CHEMICAL CLASS	Tetrakisazo (metallised)	Trisazo	Azo
C.I. CONSTITUTION NUMBER			
HUE: Daylight	Greenish Grey Unchanged in artificial light	Black	Reddish Black (redder on coppering) Redder in artificial light
DYEING: CELLULOSE			
Dyeing method	Normal	Normal	Normal for viscose
S.D.C. Classification	B	—	—
Exhaustion	—	—	—
Temp. of maximum affinity °C	—	80	—
Levelling	4	—	—
Suitable aftertreatment	5	3	3
OTHER FIBRES			
Dyeing	—	—	
Staining	Reserve: acetate, 5; wool, 3; nylon, 5; silk, 2	Wool, silk and nylon stained. Acetate heavily stained	
PRINTING		Cotton: discharge	
FASTNESS PROPERTIES			
Method	ISO	ISO	AATCC
Acid (organic)	—	4R	—
Alkali	4-5V	4G	—
Hot pressing	4-5R	—	5
Light: $\frac{1}{2}$ — $\frac{1}{2}$ normal	5	—	—
normal	6-7	6	7
2 × normal	—	—	—
Washing — alteration	3-4	4-5	5
staining	3	5	5
Water — alteration	3-4	5	5
staining	2-3	5	4
		Fast to resin finishing	
OTHER PROPERTIES			
Dischargeability	Neutral: 5 Alkaline: 4	Neutral: good Alkaline with anthraquinone: fair-moderate	—
Effect of metals — Copper	5	Unchanged	—
Iron	—	Unchanged	—
	Very good resistance to hard water	Sensitive to hard water	
NOTES AND NON-TEXTILE USAGE			*Aftercoppered on viscose

147	148		C.I. Direct Black
Azo	Disazo		CHEMICAL CLASS C.I. CONSTITUTION NUMBER
Reddish Black	Black		HUE: Daylight
Normal — — — — 3	— — Good 80 Poor —		DYEING: CELLULOSE Dyeing method S.D.C. Classification Exhaustion Temp. of maximum affinity °C Levelling Suitable aftertreatment
	— Acetate: unstained		OTHER FIBRES Dyeing Staining
			PRINTING
AATCC Viscose — — 5 — 6-7 — 4-5* 2 5 4	ISO 2-3R 4-5G 5 — 3-4 — 3 4-5 4 3		FASTNESS PROPERTIES Method Acid (organic) Alkali Hot pressing Light: $\frac{1}{3}$ — $\frac{1}{2}$ normal normal 2 × normal Washing — alteration staining Water — alteration staining
	Neutral: fair-good Alkaline: moderate Unaffected Unaffected Sensitive to hard water		OTHER PROPERTIES Dischargeability Effect of metals — Copper Iron
*On aftercoppering: Wash- ing 5/5; Water 5/4-5	Resin finishes turn the hue bluer but do not affect fastness to light. Fast to vulcanisation		NOTES AND NON-TEXTILE USAGE

NOTES

DISPERSE DYES

Historical

Commercial production of cellulose acetate fibres commenced about 1920 and confronted dyers with a fibre to which most of the then available dyes had negligible substantivity.

It seemed evident that suitable dyes should be basic and that few, if any, sulphononic acid groups should be present.¹ Such dyes were insoluble or almost so in water and presented problems in application.

British Dyestuffs Corporation introduced the first special class of dyes for cellulose acetate, the Ionamines² in 1922. These amino azo dyes, temporarily solubilised by the introduction of ω -sulphononic acid groups, hydrolysed slowly in the dyebath, the insoluble free bases then being adsorbed by the fibre. These dyeings were, in some cases, subsequently diazotised and developed with phenols or amines free from sulphononic acid groups.

It was soon found that temporary solubilisation of the dye bases was unnecessary, provided that they could be introduced into the dyebath as a fine dispersion. These dispersions of essentially water-insoluble azo, diphenylamine and anthraquinone compounds were produced initially by grinding with, or solution in, a solvent or sulphonated oil followed by precipitation in presence of soap or other surfactant such as Turkey Red Oil^{3,4,5,6}.

Development of mechanical dispersing techniques such as aqueous ball milling and use of more effective dispersing agents produced concentrated dispersions. The earlier dyes were sold in this form as pastes, from which the dye tended to settle out. Choice of suitable dispersing agents allowed them to be dried, forming readily re-dispersible powders. Recent developments have led to concentrated "liquid" brands having very low settling rates. Modern dispersions in general have much smaller particle size than the pastes of the 1920's.

This class of dyes were variously known as acetate dyes, dispersed acetate dyes, dispersion dyes and dispersol dyes. The present universally accepted name, disperse dyes, was introduced in 1951, and first defined by the Society in 1953⁷. It is currently defined by the Society as "substantially water-insoluble dyes having substantivity for one or more hydrophobic fibres, for example cellulose acetate and usually applied from fine aqueous dispersion".

Although substantially insoluble, these dyes are slightly soluble in water and uptake by the fibre is believed to take place from this aqueous phase. The degree of solubility influences the dyeing and levelling properties of the dye⁸. The solubility of the dye and hence its equilibrium uptake and dyeing rate may be modified by the dispersing agent employed¹¹. Most dispersing agents are anionic, but some surfactants used particularly to promote dye solubility and levelling are non-ionic. These can lead to instability of the dispersion¹².

Fine uniform dispersion is necessary to distribute the dye evenly throughout the dyebath, prevent filtration of the dye by the fibres being dyed and more specifically to present a large surface area of dye particles from which rapid dissolution may take place to replace that taken up by the fibre during dyeing.

The newer man-made fibres, nylon, triacetate, polyesters and acrylics, all more hydrophobic than acetate, would have proved difficult to dye had not the disperse dyes been available. Some of the dyes developed for acetate were readily applicable to these fibres, although new techniques of dyeing at high temperature or in presence of swelling agents or carriers¹⁵ had to be developed. In the search for better fastness properties demanded for the new fibres, the range of available disperse dyes has increased greatly since the publication of the 2nd Edition in 1953, from an issued total of 173 C.I. Generic Names for disperse dyes to 692 in this edition. Much of the recent development has been directed towards dyes for polyester. Two useful accounts are given by Fourness⁹ and Muller¹⁰ on aspects of the development of disperse dyes.

Chemical

Almost all disperse dyes are primary, secondary or tertiary amines of three main types (a) aminoazobenzene, (b) amino-anthraquinones and (c) nitrodiarylamines. A very limited number are more akin in structure to the vat dyes. None contain solubilising sulphononic acid groups.

Dyes containing primary amino groups may be diazotised and developed on the fibre to produce dyeings of varying fastness according to the developers used. This procedure is widely used in the production of blacks.

Non-Textile Usage

Disperse dyes may be used for surface dyeing of selected thermoplastics. (For example, cellulose acetate, polystyrene and polymethyl methacrylate.)

Textile Usage

The tables on pages 2480 and 2481 summarise the more important methods of dyeing and printing with disperse dyes. The reference letters in the first column correspond to those used in the technical data tables.

The information which follows is additional to these tables.

Acetate (sometimes called secondary acetate or diacetate). Most anthraquinone dyes are subject to gas-fume fading, i.e. fading and change of hue caused by reaction with oxides of nitrogen^{13,14} in the air. Gas-fume fading may be minimised by applying a colourless, substantive inhibitor which reacts with the oxides of nitrogen in preference to the dye.

Triacetate. Many dyes dye more rapidly, giving better colour yield and build-up if dyeing is carried out in presence of a carrier¹⁵ or above 100°C. Triacetate, like acetate, is subject to gas-fume fading. Inhibitors are used in the same way.

Nylon. Although normally dyed at 85°C higher temperatures may be required to obtain dyeings of good wet fastness when dyes of large molecular size are used. The more recently introduced nylons (e.g. 'Qiana' (DuP) and 'Nomex' (DuP)), require use of a carrier¹⁵ when dyed at 100°C.

Polyester. Except for very pale dyeings, almost all dyes require use of a carrier¹⁵ at the boil, or pressure dyeing above 125°C to attain practical rates of dyeing. Some carriers based

on phenolic compounds, e.g. *o*-phenylphenol, cause marked reduction in light fastness of the dyeings if not completely removed from the fibre (usually by dry heat treatment).

Acrylics. Although disperse dyes may be used for pale to medium dyeings, basic dyes are extensively used for brighter and heavier dyeings.

Polypropylene. This, in its unmodified form, may be dyed with aqueous dispersions of certain solvent dyes. The dyeings usually have poor fastness to dry cleaning. Numerous ways have been devised to improve dyeability, one practical way being to incorporate in the fibre organo nickel (or other chelateable metal) compounds and then dye with disperse dyes which chelate with the metal (cf. mordant dyes).

Poly(vinyl chloride) Fibres. These may be dyed with selected disperse dyes taking care not to use too high a temperature which might cause the fibres to shrink.

Wool Sheepskins and furs. Disperse dyes are readily applicable at 40–60°C. Their fastness is generally lower than on acetate and nylon.

Transfer printing. This relatively recent process, although not listed in the following application tables, is of importance. It is applicable to most man-made fibres which are dyeable with disperse dyes. The dyes, in absence of dispersing agents, are printed onto paper and subsequently transferred to the fibre in a dry-heat press. This is essentially a sublimation process and dyes of relatively low sublimation fastness are required.

TECHNICAL DATA TABLES

Dyeing Properties

For acetate and triacetate the dyeing properties have been related, where possible, to the methods specified by the S.D.C. Disperse Dyes Committee in their 1st and 2nd Reports.

1st Report—*JSDC*, **80** (1964) 237

2nd Report—*ibid.*, **81** (1965) 209

In all other cases, where the dyeing properties are not related to an A–E scale, they are based solely on the individual manufacturer's own methods of assessment.

Printing — Dischargeability

Dyes showing good dischargeability with C.I. Reducing Agent 2 are marked ✓; those which will not discharge or which have poor dischargeability are marked ×.

Fastness Properties

In general the tests quoted are based on the ISO or AATCC test methods. Two properties of particular interest in this section deserve special mention. Both are measures of the fastness of disperse dyes to heat treatments. Disperse dyes being essentially non-ionic in character will sublime readily. Whilst this makes possible transfer printing, it becomes a disadvantage should it occur during application or during heat treatments such as pleating, resin finishing, etc.

Some of the early dyes of simple structure sublime even below 130°C (dry heat) or in steam at atmospheric pressure. Later dyes, developed primarily for application to polyesters, show little or no mark off above 200°C or when steaming above 25 lb/in² (1.8 kg/cm²).

Improvement in sublimation fastness is often accompanied by increased molecular weight of the dye. This brings problems during dyeing both in levelling and in obtaining sufficient build-up within practical times. Some dyes are applicable in practice only to polyester at high temperature or by thermofixation and with a few, thermofixation is the only practical method of application.

Because of the importance of sublimation fastness in the modern usage of disperse dyes, many tests have been devised for testing the fastness of dyeings to dry heat and steam pleating. Where possible the figures in the data tables refer to the following tests (or close approximations of these).

Dry Heat:

ISO/R105/IV — part 2 Colour Fastness to Dry-heat Pleating.

AATCC Method 117–1967.

Pleating (Steam):

ISO/R105/IV — part 5 Colour Fastness to Pleating: Steam Pleating.

AATCC Method 131–1970.

(The above two steam pleating tests are identical.)

SUMMARY OF TYPICAL METHODS OF APPLICATION OF DISPERSE DYES TO TEXTILE FIBRES PRINTING

PRINTING METHOD	ACETATE	NYLON	TRIAcetATE	POLYESTER	ACRYLIC
AS (Atmospheric Steaming)	30–45 min. at atmospheric pressure	30–45 min. at atmospheric pressure	30–60 min. at atmospheric pressure	Not generally applicable	30–60 min. at atmospheric pressure
ASc (Atmospheric Steaming + carrier)	Carrier not required	Carrier not required	As above with addition of a carrier, e.g., 5% polyethylene glycol	60 min. at atmospheric pressure with addition of a carrier, e.g., 2–5% <i>p</i> -phenylphenol	Not applicable
PS (Pressure Steaming)	30 min. at 3–5 lb/in ² (0.2–0.35 kg/cm ²) (limited usage)	30 min. at 5 lb/in ² (0.35 kg/cm ²)	30 min. at 5–20 lb/in ² (0.35–1.4 kg/cm ²)	30 min. at 15–25 lb/in ² (1.0–1.8 kg/cm ²)	30 min. at 5 lb/in ² (0.35 kg/cm ²)
T (Thermofixation)	Not applicable	Fix as for dyeing	Fix as for dyeing	Fix as for dyeing	Not applicable

SUMMARY OF TYPICAL METHODS OF APPLICATION OF DISPERSE DYES TO TEXTILE FIBRES DYEING

DYEING METHOD	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
N (Normal temperatures)	65–85°C; 45–90 min.	80–100°C; 45–90 min.	90–100°C; 60–120 min.	95–100°C; 60–120 min. (pale dyeings only)	98–100°C; 60–120 min. Cool slowly to below 70°C
Nc (Normal temperatures + carrier)	Carriers not normally required	Carriers not required	As above but with the addition of a suitable carrier	As above but with the addition of a suitable carrier	Carriers not normally required
HT (High temperature, i.e. in pressurised systems)	Not applicable; fibre is delustered above 85°C	110–130°C; 30–60 min. (coverage of physical variations improved over method N)	110–120°C; 30–90 min.	125–140°C; 45–90 min. (small amounts of carrier may be used)	105°C; 60–90 min. Cool slowly to below 70°C
DD (Diazotise and develop: a 3 bath process)	1. Dye base dye: method N 2. Diazotise: 20°C; 30 min. 3. Develop: commence cold; raise to 60°C; maintain for 30 min.	1. Dye base dye: method N 2. Diazotise: 20°C; 30 min. 3. Develop: commence cold; raise to 60°C; maintain for 30 min.	1. Dye base dye: method N 2. Diazotise: 20–25°C; 30–60 min. 3. Develop: commence cold; raise to 70°C; maintain for 30 min.	Not applicable	Not applicable
3Az (3 bath Azoic) Includes also methods 3Az.c and 3Az.HT	Not applicable	Not applicable	1. Dye base dye: method N 2. Apply developer: 75°C 3. Diazotise: 60°C; 40–60 min.	1. Dye base dye: method Nc (3Az.c) or HT (3Az.HT) 2. Apply developer: 95–100°C; 60 min. 3. Diazotise: commence cold; raise to 85°C; maintain 30 min.	Not applicable
2Az (2 bath Azoic) Includes also methods 2Az.c and 2Az.HT	1. Apply base dye + developer (or azoic combination) method N 2. Diazotise: 10 min. cold; raise to 60°C; maintain 30 min.	1. Apply base dye + developer (or azoic combination) method N 2. Diazotise: 10 min. cold; raise to 60°C; maintain 30 min.	1. Apply base + developer (or azoic combination) methods Nc or HT 2. Diazotise: commence cold; raise to 70°C; maintain 30 min.	1. Apply base + developer (or azoic combination) methods Nc or HT 2. Diazotise: commence cold; raise to 80°C; maintain 30 min. (or raise to 100–105°C and maintain 15 min.)	Not normally recommended
T (pad/Thermofix) ¹⁶	Pad, dry and fix for 30 s at 150°C (pale dyeings only)	Pad, dry and fix for 60 s at 185–190°C (nylon 6) or 200–210°C (nylon 6.6)	Pad, dry and fix for 30–60 s at 190°C	Pad, dry and fix for 30–60 s at 180–220°C	Not applicable
Pad/Roll	Batch 2–4 h at 80–90°C dry bulb and 70–80°C wet bulb	Batch 2–4 h at 90–95°C dry bulb and 85–90°C wet bulb	Batch 2–8 h at 95–105°C dry bulb and 90–95°C wet bulb	Not applicable	Not applicable
Pad/steam	Fix as for prints	Fix as for prints	Fix as for prints	Fix as for prints	Fix as for prints

NOTES

Dyeing Conditions: In most exhaust methods, dyeing commences at 40–70°C, dependent on the fibre, before raising to the final dyeing temperature. It is this final temperature and time of dyeing which is quoted in the above table

Dyebath Additions: It is usual to set the dyebath with 1–2 g/l of a dispersing agent to help maintain the dye in dispersion during dyeing. Although not directly affected by pH variations, some disperse dyes may be unstable in alkaline or strongly acid baths. For this reason pH 5–6 is usually recommended

Carriers: Where employed, 2–10 g/l is usually required, the actual amount being dependent on liquor ratio and depth of dyeing. Murray and Mortimer¹⁵ give a useful review of available carriers

Diazotisation: Most diazotisation processes are carried out in 4–12% sodium nitrite and 10–40% conc. hydrochloric acid, on weight of fibre

NOTE: Times, temperatures and pressures in the preceeding tables are intended as a guide to typical conditions. No attempt has been made to cover all possible methods.

REFERENCES

- ¹ Briggs. *JSDC*, **37** (1921) 287
- ² Green and Saunders. *JSDC*, **39** (1923) 10; **40** (1924) 138; *BP* 197809; 200873; 212029; 212030
- ³ B.D.C., Baddiley and Shepherdson. *BP* 211720
- ⁴ BrC and Ellis. *BP* 219349
- ⁵ Silver Springs Bleaching and Dyeing Co. Ltd. and Hall. *BP* 222001
- ⁶ Wilson, J. *JSDC* **41** (1925) 169; Scottish Dyes Ltd. *BP* 231206; 238936; 253584; Morton Sundour. *BP* 214112; 230116
- ⁷ SDC. *JSDC*, **69** (1953) 121
- ⁸ Bird. *JSDC*, **70** (1954) 68
- ⁹ Fourness. *JSDC*, **72** (1956) 513.
- ¹⁰ Muller. *Am. Dye. Rep.*, 1970 (March) 37
- ¹¹ Bird, Harris and Manchester. *JSDC*, **71** (1955) 139
- ¹² Murray and Mortimer. *JSDC*, **87** (1971)
- ¹³ Rowe and Chamberlin. *JSDC*, **53** (1937), 268
- ¹⁴ Couper. *Text. Research J.*, **21** (1951) 720
- ¹⁵ Murray and Mortimer. *Review of Progress in Coloration*, vol. 2.
- ¹⁶ Gibson, *USP* 2663612

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C.I. Disperse Yellow 1—2

C.I. Disperse Yellow	1				2
CHEMICAL CLASS	Nitro				Nitro
C.I. CONSTITUTION NO.	10345				—
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER	ACRYLIC	ACETATE
HUE	Bright Red-dish Yellow redder	Bright Reddish Yellow redder	Bright Red-dish Yellow redder	Reddish Yellow redder	Bright Yellow redder and brighter
Artificial Light (tungsten)					
DYEING					
Methods	N	N	Nc, HT	N	N
Dyeing Properties					
Rate	A—v. rapid	A—v. rapid	—	—	medium
Temp. range	B—v. good	B—v. good	—	—	—
Levelling	A—ex.	A—ex.	good (HT)	—	—
Build-up	A—ex.	A—ex.	good (HT)	—	—
Reservation	cotton	4-5	4-5	4-5	5
	viscose	4-5	4-5	4-5	5
	wool	3-4	3	3	1
PRINTING					
Fixation	AS	PS	PS, (ASc)	PS, (AS)	AS
Dischargeability	x	x	x	x	x
FASTNESS					
Test Methods	ISO AATCC	ISO	ISO	ISO	AATCC
Dry Heat	conditions	mild	intermediate	severe	mild
change	5	5	5	4	4
staining	4-5	3	2	4-5	—
Light	source	day.	daylight	daylight	daylight
pale	4	4-5	4-5	5-6	5
medium	4-5	4-5	5	6	5-6
heavy	4-5	—	6	6	5-6
Nitrogen Oxides	5	5	5	5	5
Perspiration	acid/alk.	alk.	alk.	alk.	alk.
change	5	1-2	5	4-5	5
staining	2	—	2-3	5	3
Pleating (steam)	conditions	mild	intermediate	severe	intermediate
change	4-5	—	5	5	4-5
staining	4	—	4-5	4	4-5
Washing	conditions	ISO 2	ISO 3	ISO 4	ISO 3
change	2-3	—	3-4	4-5	4-5
staining	2-3	—	3	5	5
OTHER USES					
Textile	Nylon: Light (ISO), 2-3, 3, 3-4; (AATCC), 1-2 PVC Fibres: Suitable				Acrylic: Daylight (AATCC), 7-8 Polyester: Daylight (AATCC), 7-8 Washing III, 4
Non-Textile	Wool Sheepskins and Furs: For level pastel shades Plastics: Surface dyeing of thermoplastics See C.I. Solvent Yellow 52				Thermoplastics: Surface dyeing
NOTES	Literature: <i>Vickerstaff</i> , 148, 273, 368, 371, 375 <i>Bird, JSDC</i> , 70 (1954) 74, 76				

C.I. Disperse Yellow 3—4

C.I. Disperse Yellow		3									
CHEMICAL CLASS		Azo									
C.I. CONSTITUTION NO.		11855									
SUBSTRATE		ACETATE		NYLON 6-6		TRIACETATE		POLYESTER		ACRYLIC	
HUE		Yellow		Yellow		Yellow		Bright Yellow		Yellow	
Artificial Light (tungsten)		redder		slightly duller		redder		redder		redder	
DYEING Methods		N		N		N		Nc, HT		N	
Dyeing Properties								HT			
Rate		B—rapid		rapid		B—rapid		rapid		rapid	
Temp. range		C—good		good		C—good		good		good	
Levelling		B—v. good		v. good		B—v. good		v. good		v. good	
Build-up		B—v. good		good		B—v. good		v. good		mod-good	
Reservation		—		—		—		—		—	
cotton		4-5		4-5		4		4		—	
viscose		3		3-4		3		3		—	
wool											
PRINTING		AS		AS		PS (AS)		PS (AS)		PS, (AS)	
Fixation		✓		✓		✓		✓		—	
Dischargeability											
FASTNESS											
Test Methods		ISO AATCC		ISO AATCC		ISO AATCC		ISO		ISO	
Dry Heat		mild III		inter. —		inter. —		inter.		mild	
conditions		4-5 —		4-5 —		5 —		4-5		4-5	
change		3-4 4		3 —		4-5 —		3		4-5	
staining											
Light		day. C. arc		day. day.		day C. arc		daylight		daylight	
source		4 3		5-6 5		4 1		5		5-6	
pale		5 5		6 6		5 2		6		6	
medium		6 —		6-7 7		6 4-5		6-7		6-7	
heavy											
Nitrogen Oxides		5 5		5 5		5 5		5		5	
Perspiration		alk. alk.		alk. —		alk. —		alk.		alk.	
acid/alk.		4-5 5		4-5 —		5 —		5		5	
change		3 3		3 —		3-4 —		5		5	
staining											
Pleating		— —		inter. —		inter. III		intermediate		intermediate	
(steam)		— —		4 —		4 5		4-5		4-5	
change		— —		3 —		4 2-3		3-4		3-4	
staining											
Washing		ISO 2 II		ISO 2 —		ISO 3 III		ISO 4		ISO 3	
conditions		4 5		3-4 —		4 4-5		4-5		4-5	
change		3 4		3-4 —		4 2-3		4-5		4-5	
staining											
OTHER USES											
Textile		Nylon: Important component for hosiery shades									
		Polyvinyl chloride fibres: Suitable									
		Acrylic: AATCC, Light (pale), 6									
		Wool Sheepskins and Furs: Level pastel shades									
		Plastics: Surface dyeing cellulose acetate, polymethyl methacrylate, etc.									
		See C.I. Solvent Yellow 77									
Non-Textile											
NOTES		Subject to catalytic fading when applied in admixture with tetra-substituted anthraquinone blue dyes									
		Compare C.I. Disperse Yellow 27									

4					C.I. Disperse Yellow
Azo 12770					CHEMICAL CLASS
					C.I. CONSTITUTION NO.
ACETATE	NYLON 6-6	TRIACETATE	POLYESTER	ACRYLIC	SUBSTRATE
Bright Greenish Yellow redder	Bright Greenish Yellow redder	Greenish Yellow redder	Bright Greenish Yellow redder	Greenish Yellow redder	HUE
					Artificial Light (tungsten)
N	N	N	HT (Nc)	N	DYEING
					Methods
C—mod.	rapid	—	—	—	Dyeing Properties
B—v. good	good	—	—	—	Rate
—	good	—	—	—	Temp. range
B—v. good	poor	—	—	—	Levelling
—	3	—	—	—	Build-up
—	3	—	4	—	Reservation
—	1	—	—	—	cotton
AS	AS	PS, (AS)	PS, (ASc)	PS, (AS)	viscose
✓	✓	✓	—	—	wool
					PRINTING
					Fixation
					Dischargeability
ISO mild 4-5 3-4	ISO intermediate 3-4 2-3	ISO intermediate 4-5 3	ISO intermediate 4 2-3	ISO mild 4-5 4	FASTNESS
daylight	daylight	daylight	daylight	daylight	Test Methods
3	2-3	3-4	4	4-5	Dry Heat
4	3	4	4-5	5	conditions
—	3	—	—	—	change
5	5	5	5	5	staining
alk.	alk.	alk.	alk.	alk.	Light
4-5	4-5	4-5	5	5	source
3-4	3	4	5	5	pale
mild	intermediate	intermediate	intermediate	intermediate	medium
5	4	4-5	4-5	4	heavy
4	3-4	3-4	3	3	Nitrogen Oxides
ISO 2	ISO 2	ISO 3	ISO 3	ISO 2	Perspiration
3-4	3-4	4	5	5	acid/alk.
3-4	3-4	4	5	4-5	change
					staining
					Pleating
					(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
Acetate: (AATCC) Light (C. arc), 3-4; Washing II, 3-4, 3-4 Wool Sheepskin and Furs: For level pastel shades					OTHER USES
					Textile
					Non-Textile
Literature: <i>Vickerstaff</i> , 273, 368, 371 Bird, <i>JSDC</i> , 70 (1954), 76					NOTES

C.I. Disperse Yellow 5—7

C.I. Disperse Yellow	5				6
CHEMICAL CLASS	Azo				Nitro
C.I. CONSTITUTION NO.	12790				—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE
HUE	Greenish Yellow	Greenish Yellow	Greenish Yellow	Greenish Yellow	Bright Greenish Yellow
Artificial Light (tungsten)	redder	redder	redder	redder	unchanged
DYEING					
Methods	N	N	N	HT, (Nc)	N
Dyeing Properties					
Rate	C—mod.	moderate	C—mod.	HT	moderate
Temp. range	C—good	moderate	D—mod.	moderate	v. good
Levelling	B—v. good	v. good	C—good	v. good	—
Build-up	B—v. good	good	D—mod.	good	good
Reservation	—	—	—	—	—
cotton	4-5	—	3-4	4	5
viscose	3-4	—	2-3	3-4	3-4
wool	—	—	—	—	—
PRINTING					
Fixation	AS	AS	PS, (AS)	PS	unsuitable*
Dischargeability	✓	✓	✓	—	×
FASTNESS					
Test Methods	ISO	AATCC	ISO	ISO	ISO
Dry Heat	mild	III	intermediate	intermediate	—
conditions	5	—	—	5	—
change	4-5	5	4	4	—
staining	—	—	—	—	—
Light	source	C. arc	daylight	daylight	daylight
pale	4-5	2	2-3	4	3
medium	5	3-4	3-4	5	4
heavy	5	—	4	5	5
Nitrogen Oxides	4-5	5	5	4-5	5
Perspiration	alk.	alk.	alk.	alk.	alk.
acid/alk.	5	5	5	5	5
change	3	3	3-4	4-5	4
staining	—	—	—	—	—
Pleating	conditions	—	intermediate	intermediate	—
(steam)	change	—	5	5	—
staining	4-5	—	4-5	4-5	—
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 4
change	4	4-5	3-4	4-5	5
staining	3	3-4	4	4	5
OTHER USES					
Textile	Nylon: Not recommended by some manufacturers because of poor fastness to light and wet treatments				Nylon: Lower light fastness than on acetate
Non-Textile	Polyvinyl chloride fibres: Suitable Wool Sheepskins and Furs: For level pastel shades Plastics: Surface dyeing of thermoplastics. As solvent soluble dye for transparent styrene resins				
NOTES	Susceptible to catalytic fading when applied in admixture with tetra-substituted anthraquinone blue dyes				*Poor colour value, tends to volatilise Literature: BP 283253 USP 1679935

7				C.I. Disperse Yellow
Disazo 26090				CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Reddish Yellow much redder	NYLON 6-6 Reddish Yellow redder	TRIACETATE Reddish Yellow redder	POLYESTER Reddish Yellow redder	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool
N D—slow E—poor C—good B—v. good — 4 2 AS ✓	N moderate moderate good v. good — 4 1-2 AS ✓	N, (Nc) D—slow E—poor C—good B—v. good (Nc) — 3-4 1-2 PS ✓	HT, Nc HT moderate moderate good good — 3-4 1 PS —	PRINTING Fixation Dischargeability
ISO — — — daylight 5-6 6 6-7 4 alk. 4-5 4-5 — — — ISO 2 4-5 4	ISO intermediate 4 3-4 daylight 4-5 5 5-6 5 alk. 5 4-5 intermediate 4-5 4 ISO 2 4 3-4	ISO intermediate — 3 daylight 5 5-6 6 4 alk. 5 4-5 intermediate 5 3 ISO 3 4-5 4	ISO intermediate 4 3 daylight 5 6 6-7 5 alk. 5 5 severe 4 3-4 ISO 4 4-5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Acrylics: Daylight (ISO), 5-6, 6, 6. Dyeing properties, poor Polyvinyl chloride fibres: Suitable, but light fastness lower than on acetate Wool Sheepskins and furs: For level pastel shades Plastics: Surface dyeing polymethyl methacrylate etc.				OTHER USES Textile Non-Textile
Generally similar to C.I. Disperse Yellow 23				NOTES

C.I. Disperse Yellow 8—10

C.I. Disperse Yellow		8				
CHEMICAL CLASS		Monoazo				
C.I. CONSTITUTION NO.		12690				
SUBSTRATE		ACETATE	NYLON 6-6	TRIACETATE	POLYESTER	ACRYLIC
HUE		Yellow	Yellow	Greenish Yellow	Yellow	Yellow
Artificial Light (tungsten)		redder	redder & brighter	redder & brighter	redder	redder
DYEING						
Methods		N	N	N	HT, Nc	N
Dyeing Properties						
Rate		rapid	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		good	—	—	—	—
Reservation	cotton	5	—	—	—	—
	viscose	5	—	—	—	—
	wool	2	—	—	—	—
PRINTING						
Fixation		AS	AS	PS, (AS)	PS, AS _c	PS, (AS)
Dischargeability		✓	×	×	×	—
FASTNESS						
Test Methods		ISO AATCC	ISO	ISO	ISO	ISO AATCC
Dry Heat	conditions	— —	severe	intermediate	intermediate	inter. —
	change	— —	4	4-5	4-5	4-5 —
	staining	— —	3	3	4	4 —
Light	source	day. C. arc	daylight	daylight	daylight	day. C. arc
	pale	— 3	—	—	6-7	— —
	medium	6-7 4	5-6	6	6-7	5-6 6
	heavy	— —	—	—	—	— —
Nitrogen Oxides		5 5	5	4-5	5	5 —
Perspiration	acid/alk.	alk. —	alk.	alk.	alk.	alk. alk.
	change	4-5 —	4-5	4	4	4-5 4-5
	staining	1-2 —	3	3	5	5 4-5
Pleating	conditions	— —	intermediate	intermediate	intermediate	inter. —
(steam)	change	— —	4-5	4-5	4-5	4 —
	staining	— —	3	4-5	4-5	4 —
Washing	conditions	ISO 2 I	ISO 2	ISO 2	ISO 3	ISO 3 II
	change	3 2	4	4-5	4-5	4-5 4-5
	staining	2 —	4-5	4-5	5	5 5
OTHER USES						
Textile		Nylon: Light (AATCC), 4-5				
Non-Textile		Wool Sheepskins and Furs Thermoplastics: Surface dyeing				
NOTES						

9				10	C.I. Disperse Yellow
Nitro 10375				Azo 12795	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Dull Reddish Yellow redder	TRIACETATE Dull Reddish Yellow redder	POLYESTER Dull Reddish Yellow redder	ACRYLIC Dull Reddish Yellow redder	ACETATE Bright Greenish Yellow slightly redder	
N A—v. rapid C—good B—v. good B—v. good — 5 4 AS x	N B—rapid C—good B—v. good B—v. good — 5 3-4 PS, (AS) x	HT, Nc HT rapid good good good — 4 3 PS, (ASc) x	N rapid good good good — 4 3 PS, (AS) x	N slow good good good 5 5 4 AS ✓	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO mild 4-5 4 daylight 4-5 5 5-6 4 alk. 4 3-4 mild 5 4-5 ISO 2 4 3-4	ISO intermediate 4-5 3-4 daylight 4 5 6 3-4 alk. 4-5 4-5 intermediate 5 4 ISO 3 4 4	ISO intermediate 4-5 3 daylight 5 5-6 6 5 alk. 5 5 severe 5 4 ISO 4 5 4-5	ISO mild 5 4-5 daylight 5-6 5-6 6 5 alk. 5 5 intermediate 4-5 4-5 ISO 2 4-5 5	C* 120°C/10 sec 4 — daylight 2 3 3 5 — 3 — — — — — 3-4 —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon: Unsuitable due to poor affinity Wool Sheepskin and Furs: For level pastel shades Plastics: Surface dyeing polymethyl methacrylate etc. See C.I. Solvent Orange 53				Wool Sheepskins Furs Thermoplastics	OTHER USES Textile Non-Textile
Low staining makes this dye suitable for dyeing blends containing wool or cellulosic fibres				*Tests according to Deutsche Normen Standards 1951 See Colour Index, 2nd Edition	NOTES

C.I. Disperse Yellow 11—14

C.I. Disperse Yellow	11 and 11:1	12			
CHEMICAL CLASS	Aminoketone	Ketonimine			
C.I. CONSTITUTION NO.	56200 (11:1 is similar)	—			
SUBSTRATE	ACETATE	ACETATE	TRIACETATE	ACRYLIC	
HUE	Fluorescent Greenish Yellow redder	Bright Greenish Yellow redder	Bright Greenish Yellow redder	Bright Greenish Yellow redder	
Artificial Light (tungsten)					
DYEING					
Methods	N	N	N, (Nc)	N	
Dyeing Properties					
Rate	moderate	slow	—	—	
Temp. range	moderate	good	—	—	
Levelling	good	—	—	—	
Build-up	—	poor	—	—	
Reservation					
cotton	4	4	—	—	
viscose	4	4	—	—	
wool	1	1-2	—	—	
PRINTING					
Fixation	AS	AS	PS, (AS)	PS, (AS)	
Dischargeability	×	×	×	×	
FASTNESS					
Test Methods	AATCC	ISO	AATCC	ISO	ISO
Dry Heat	conditions	—	—	intermediate	intermediate
change	—	—	—	4-5	5
staining	—	—	—	4-5	5
Light	source	daylight	C. arc	daylight	daylight
pale	—	5	—	—	—
medium	1	5-6	5-6	5	4
heavy	—	6	—	—	—
Nitrogen Oxides	4	5	5	5	5
Perspiration	acid/alk.	alk.	—	alkaline	alkaline
change	4-5	5	—	4-5	4-5
staining	4-5	4	—	4-5	5
Pleating	conditions	—	—	intermediate	intermediate
(steam)	change	—	—	4-5	4-5
staining	—	—	—	5	5
Washing	conditions	ISO 2	I	ISO 2	ISO 3
change	—	4-5	4-5	4-5	4-5
staining	—	4-5	—	4-5	5
OTHER USES					
Textile	Nylon (AATCC): Light, 1; Perspiration, 3-4	Nylon: Poor affinity and build up; dyes only in presence of acid. Light (AATCC), 3			
Non-Textile	C.I. Solvent Yellow 44	Wool Sheepskins and Furs			
NOTES	For fluorescent shades where light fastness is unimportant				

13				14	C.I. Disperse Yellow
Anthraquinone 58900				Nitro 10340	CHEMICAL CLASS
ACETATE	NYLON 6-6	TRIACETATE	POLYESTER	ACETATE	C.I. CONSTITUTION NO.
Fluorescent Greenish Yellow redder	Fluorescent Greenish Yellow redder	Fluorescent Greenish Yellow redder	Fluorescent Greenish Yellow redder	Bright Greenish Yellow slightly redder	SUBSTRATE
					HUE
					Artificial Light (tungsten)
N	N	N	HT, Nc	N	DYEING Methods
D—slow C—good D—moderate D—moderate	rapid good good moderate	D—slow D—moderate B—v. good C—good	— — good good	moderate good good moderate	Dyeing Properties Rate Temp. range Levelling Build-up
3-4 4-5 3	5 5 4	4 4 1	4 4 1	5 5 3-4	Reservation cotton viscose wool
— x	— x	— x	— x	tends to volatalise x	PRINTING Fixation Dischargeability
ISO — — —	ISO intermediate 5 3-4	ISO intermediate 5 4	ISO intermediate 4 3	ISO — — —	FASTNESS Test Methods
daylight 4 4-5 4-5	daylight 1 1-2 2	daylight 3 4 4	daylight 2 3 3	daylight 3 3-4 3-4	Dry Heat conditions change staining
5	5	5	5	5	Light source pale medium heavy
alk. 4-5 3-4	alk. 5 5	alk. 5 4-5	alk. 5 5	alk. 5 3	Nitrogen Oxides
— — —	severe 5 3-4	intermediate 5 4	intermediate 4-5 4	— — —	Perspiration acid/alk. change staining
ISO 2 4 4	ISO 3 3-4 4	ISO 3 4-5 3-4	ISO 4 5 4-5	ISO 2 3-4 4	Pleating conditions (steam) change staining
Wool Sheepskins and Furs				Polyvinylchloride	OTHER USES Textile
				Plastics: Surface dye- ing methyl methacryl- ate etc.	Non-Textile
Literature: <i>Vickerstaff</i> , 148, 273, 368, 371 <i>Bird, JSDC</i> , 70 (1954), 74, 76					NOTES

C.I. Disperse Yellow 15—22

C.I. Disperse Yellow	15	16	17		
CHEMICAL CLASS	—	Azo	Nitro		
C.I. CONSTITUTION NO.	—	12700	—		
SUBSTRATE	ACETATE	ACETATE	ACETATE	NYLON	POLYESTER
HUE	—	Yellow	Bright Reddish Yellow	Orange	Yellowish Orange
Artificial Light (tungsten)	—	redder	unchanged	unchanged	slightly redder
DYEING					
Methods		N	N	N	HT, Nc, (T-shading only)
Dyeing Properties					
Rate		moderate	moderate	—	—
Temp. range		good	poor	—	—
Levelling		good	moderate	—	—
Build-up		good	moderate	—	—
Reservation	cotton	4	4	—	—
	viscose	4	4	—	—
	wool	1-2	1-2	—	—
PRINTING					
Fixation		tends to volatilise	AS	AS	PS
Dischargeability		x	x	x	x
FASTNESS					
Test Methods					
Dry Heat	conditions	ISO	A*	A*	AATCC
	change	—	—	—	—
	staining	—	—	—	—
Light	source	daylight	daylight	daylight	—
	pale	3	3	3	—
	medium	4	6-7	6	7
	heavy	4-5	—	—	—
Nitrogen Oxides	—	5	3	5	—
Perspiration	acid/alk.	alk.	—	—	—
	change	5	3	3	4-5
	staining	4	—	—	—
Pleating (steam)	conditions	—	—	—	—
	change	—	—	—	—
	staining	—	—	—	—
Washing	conditions	ISO 2	II	II	IV
	change	3	5	5	4
	staining	3	—	—	—
OTHER USES					
Textile		Nylon: Fastness similar to acetate	Triacetate: Suitable		
Non-Textile		Woolskins & Furs See C.I. Solvent Yellow 16			
NOTES	*Tests according to AATCC Methods 1949 See Colour Index, 2nd Edition		*Tests according to AATCC Yearbook 1949 See Colour Index, 2nd Edition		

18	19	20	21	22	C.I. Disperse Yellow
	Azo — ACETATE Bright Greenish Yellow redder	— — ACETATE Bright Greenish Yellow slightly redder	— — ACETATE Bright Yellow yellower	Nitro 10336 ACETATE Bright Yellow slightly redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
This C.I. Generic Name is discontinued	N moderate very good good good 4-5 4-5 3 AS ✓	N moderate moderate good good 5 5 4 AS ✓	N moderate moderate good moderate 5 5 4 AS ✓	N moderate good — good 5 5 4 tends to volatilise ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	ISO — — — daylight 5-6 6 6-7 5 alk. 4 1-2 — — — ISO 2 3-4 2	ISO — — — daylight 5 6 6-7 5 alk. 4 3-4 — — — ISO 1 4 4	ISO — — — daylight 4 4-5 5 5 alk. 4 3-4 — — — ISO 1 4 4	ISO — — — daylight 6-7 7 7 5 alk. 4 4 — — — ISO 2 3 2	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Triacetate } moderate Polyester } fastness Nylon/Acrylic: Unsuitable	PVC fibres			OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Yellow 23—27

C.I. Disperse Yellow	23				24
CHEMICAL CLASS	Disazo				Nitro
C.I. CONSTITUTION NO.	26070				—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE
HUE	Reddish Yellow	Reddish Yellow	Reddish Yellow	Reddish Yellow	Bright Greenish Yellow
Artificial Light (tungsten)	redder	redder	redder	redder	redder
DYEING					
Methods	N	N	N (Nc)	HT, Nc	N
Dyeing Properties					
Rate	D—slow	moderate	D—slow	HT	very rapid
Temp. range	E—poor	moderate	E—poor	moderate	excellent
Levelling	C—good	good	C—good	good	excellent
Build-up	B—v. good	very good	B—v. good (Nc)	good	—
Reservation	—	—	—	—	4
cotton	4	4	3-4	3-4	4
viscose	2	1-2	1-2	1	3
wool					
PRINTING					
Fixation	AS	AS	PS	PS	AS
Dischargeability	✓	✓	✓	—	×
FASTNESS					
Test Methods	ISO	ISO AATCC	ISO	ISO	ISO
Dry Heat	—	inter. —	intermediate	intermediate	—
conditions	—	4 —	4-5	4	—
change	—	3-4 —	3-4	3-4	—
staining					
Light	daylight	day. C. arc	daylight	daylight	daylight
source	5-6	4-5 6-7	5	5-6	4
pale	6	5 —	6	6-7	5
medium	7	5-6 6	6-7	7	6
heavy					
Nitrogen Oxides	5	5 5	5	5	5
Perspiration	alk.	alk. alk.	alk.	alk.	alk.
acid/alk.	4-5	4-5 3-4	5	5	4
change	4	4-5 —	4-5	5	3
staining					
Pleating	—	inter. —	intermediate	intermediate	—
(steam)	—	4-5 —	5	5	—
change	—	4 —	3	4	—
staining					
Washing	ISO 2	ISO 2 II	ISO 3	ISO 4	ISO 1
conditions	4-5	4 3-4	4-5	4-5	4
change	4	3 —	4	4-5	4
staining					
OTHER USES	Acetate: Fastness (AATCC), persp., 3-4; washing II, 3-4 Polyester: Fastness (AATCC), light (C. arc), 6, 7-8				Nylon: Suitable
Textile					
Non-Textile	Plastics: Surface dyeing of polymethyl methacrylate etc.				
NOTES	Generally similar to C.I. Disperse Yellow 7				Literature: BP 598371 USP 2506224 FP 966771 Ital P 430435

25	26	27				C.I. Disperse Yellow
— — ACETATE Reddish Yellow redder	Nitro 10348 ACETATE Reddish Yellow redder	Azo — ACETATE Bright Yellow redder NYLON 6-6 Bright Yellow redder TRIACETATE Bright Yellow redder POLYESTER Yellow redder				CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N rapid good good very good 5 5 1-2 AS —	N moderate very good — very good 5 5 3-4 tends to volatilise X	N D—slow E—poor C—good C—good — 4-5 3 AS ✓	N slow poor moderate good — 4-5 3 AS ✓	N, (Nc) C—moderate — — C—good (Nc) — — — PS, (AS) —	Nc, HT, T — — — — — — — PS, (T), (ASc) —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
A* — — — — — 1-2 — 5 — 4-5 — — — — — 4-5 —	ISO — — — daylight 6-7 7 7 5 alk 5 4 — — — ISO 2 3 2	ISO mild 5 4-5 daylight 4 5 6 5 alk. 5 5 mild 5 4-5 ISO 2 5 5	ISO intermediate 5 4-5 daylight 5-6 6 6-7 5 alk. 5 5 intermediate 5 4-5 ISO 2 4-5 4	ISO intermediate 5 4-5 daylight 4 5 6 5 alk. 5 5 intermediate 5 5 ISO 3 5 5	ISO intermediate 4-5 4 daylight 6-7 6-7 7 5 alk. 5 5 severe 5 4-5 ISO 4 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Nylon: Poor affinity, low light fastness					OTHER USES Textile Non-Textile
*Tests according to AATCC Methods 1949— see Colour Index 2nd Edition Soluble in CCl ₄		Generally similar to C.I. Disperse Yellow 3, but with superior fastness to sublimation and wet treatments Subject to catalytic fading in admixture with tetra-substituted anthraquinone blues				NOTES

C.I. Disperse Yellow 28—31

C.I. Disperse Yellow	28			29, 30
CHEMICAL CLASS	—			
C.I. CONSTITUTION NO.	—			
SUBSTRATE	ACETATE	ACETATE	NYLON 6-6	
HUE	Reddish Yellow	Bordeaux	Yellowish Orange	
Artificial Light (tungsten)	unchanged	slightly yellower	redder	
DYEING				
Methods	N	DD (with C.I. Developer 8)	N	
Dyeing Properties				
Rate	moderate	—	—	
Temp. range	—	—	—	
Levelling	good	—	—	
Build-up	moderate	—	—	
Reservation				
cotton	4	—	—	
viscose	4	—	—	
wool	1-2	—	—	
PRINTING				
Fixation	AS	—	—	
Dischargeability	x	—	—	
FASTNESS				These C.I. Generic Names are discontinued
Test Methods	A*	A*	A*	
Dry Heat	—	—	—	
conditions	—	—	—	
change	—	—	—	
staining	—	—	—	
Light	daylight	daylight	daylight	
source	—	—	—	
pale	4	4	3	
medium	—	—	—	
heavy	—	—	—	
Nitrogen Oxides	1	5	—	
Perspiration	alk.	alk.	alk.	
acid/alk.	3	3	3	
change	—	—	—	
staining	—	—	—	
Pleating	—	—	—	
(steam)	—	—	—	
change	—	—	—	
staining	—	—	—	
Washing	II	II	II	
conditions	5	5	5	
change	—	—	—	
staining	—	—	—	
OTHER USES				
Textile				
Non-Textile				
NOTES	*Tests according to AATCC Yearbook 1949 See Colour Index, 2nd Edition			

31										C.I. Disperse Yellow	
Methine 48000										CHEMICAL CLASS	
										C.I. CONSTITUTION NO.	
ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC		SUBSTRATE	
Greenish Yellow redder		Greenish Yellow redder		Greenish Yellow redder		Greenish Yellow redder		Greenish Yellow redder		HUE	
N		N		N		HT		N		DYEING Methods	
B—rapid		—		—		—		—		Dyeing Properties	
C—good		—		—		—		—		Rate	
B—very good		—		—		—		—		Temp. range	
D—moderate		—		—		—		—		Levelling	
4		—		—		—		—		Build-up	
4		—		—		—		—		Reservation	
2		—		—		—		—		cotton	
AS		AS		PS (AS)		PS (ASc)		PS		PRINTING	
X		X		X		X		X		Fixation	
										Dischargeability	
ISO		AATCC		ISO		ISO		ISO		FASTNESS	
—		—		—		severe		mild		Test Methods	
—		—		—		3-4		4-5		Dry Heat	
—		—		—		—		—		conditions	
day.		C. arc		day.		daylight		daylight		Light	
6		—		4-5		4-5		5		source	
6-7		5-6		5		5		6		pale	
—		—		—		—		—		medium	
5		5		5		5		5		heavy	
alk.		alk.		alk.		alkaline		alkaline		Nitrogen Oxides	
5		2-5		5		5		5		Perspiration	
3-4		4-3		3-4		4		5		acid/alk.	
100C/30'		100C/30'		intermediate		intermediate		intermediate		change	
5		5		4-5		4-5		4-5		staining	
—		—		—		—		—		Pleating	
ISO 2		I		ISO 2		ISO 3		ISO 2		(steam)	
4		4-5		3		4		5		conditions	
3		2		3-4		3-4		5		change	
										staining	
Surface dyeing of thermoplastics										OTHER USES	
										Textile	
										Non-Textile	
										NOTES	

C.I. Disperse Yellow 32—35

C.I. Disperse Yellow	32		33			
CHEMICAL CLASS	Monoazo		Nitro (Nitrodiphenylamine)			
C.I. CONSTITUTION NO.	—		—			
SUBSTRATE	ACETATE	NYLON 6·6	ACETATE	TRIACETATE	POLYESTER	ACRYLIC
HUE	Yellow	Reddish Yellow	Bright Yellow	Bright Yellow	Yellow	Yellow
Artificial Light (tungsten)	redder, brighter	redder	redder	redder	redder	redder
DYEING						
Methods	N	N	N	N	HT, T, (Nc)*	N
Dyeing Properties						
Rate	very rapid	—	B—rapid	B—rapid	—	—
Temp. range	good	—	C—good	—	—	—
Levelling	good	—	B—v. good	—	—	—
Build-up	—	—	C—good	C—good	—	moderate
Reservation						
cotton	4-5	4-5	—	—	—	—
viscose	4-5	4-5	5	—	—	—
wool	1-2	1-2	3-4	—	—	—
PRINTING						
Fixation	AS	AS	AS	PS, (AS)	PS, T	PS, (AS)
Dischargeability	✓	✓	×	×	×	×
FASTNESS						
Test Methods	AATCC	AATCC	ISO AATCC	ISO AATCC	ISO AATCC	ISO
Dry Heat						
conditions	—	—	mild —	inter. —	inter. III	mild
change	—	—	5 —	5 —	4-5 —	5
staining	—	—	5 —	5 —	4 4-5	5
Light						
source	Carbon arc	—	day. day.	day. C. arc	day. C. arc	daylight
pale	—	—	6 6	6-7 —	6-7 —	6
medium	3	4-5	6-7 8	6-7 7-8	7 8	6-7
heavy	—	—	7 —	7 —	7 —	6-7
Nitrogen Oxides	5	5	5 5	5 5	5 5	5
Perspiration						
acid/alk.	alkaline	alkaline	alk. alk.	alk. alk.	alk. alk.	alkaline
change	5	4-5	4-5 5	5 —	5 5	5
staining	3	4-5	3 3	4 3-4	5 5	5
Pleating						
(steam)						
conditions	—	—	mild —	inter. —	severe —	intermediate
change	—	—	5 —	5 —	5 —	4-5
staining	—	—	4-5 —	5 —	5 —	5
Washing						
conditions	I	I	ISO 2 II	ISO 3 II	ISO 4 III	ISO 2
change	3	4	3 3-4	4-5 4-5	5 5	5
staining	—	—	2-3 2-3	4 4	5 5	5
OTHER USES						
Textile			Nylon: Light fastness (AATCC—C. arc), 3, 4			
			Polyvinylchloride			
Non-Textile			Woolskins			
NOTES			*Polyester: Build-up with carrier at the boil is poor			

34			35	C.I. Disperse Yellow
Nitro (Nitrodiphenylamine)			Monoazo	CHEMICAL CLASS
—			—	C.I. CONSTITUTION NO.
ACETATE	TRIACETATE	POLYESTER	ACETATE	SUBSTRATE
Bright Reddish Yellow redder	Bright Reddish Yellow redder	Reddish Yellow redder	Bright Reddish Yellow redder	HUE
				Artificial Light (tungsten)
N	N (Nc)	HT, (Nc)	N	DYEING Methods
C—moderate C—good B—very good B—very good	C—moderate — — B—very good (Nc)	— — — —	slow moderate — good	Dyeing Properties Rate Temp. range Levelling Build-up
— 5 3	— — —	— — —	4 4 1-2	Reservation cotton viscose wool
AS x	PS, (AS) x	PS, (ASc) x	AS x	PRINTING Fixation Dischargeability
ISO mild 5 4-5	AATCC — — —	ISO intermediate 4-5 4-5	ISO severe 4 3	FASTNESS Test Methods
daylight 6 6-7 7	daylight 6 8 —	daylight 6-7 6-7 7	daylight 6-7 6-7 7	Dry Heat conditions change staining
5	5	5	5	Light source pale medium heavy
alkaline 5 3-4	alkaline 5 3	alkaline 5 4	alkaline 5 5	Nitrogen Oxides
mild 5 5	— — —	intermediate 5 5	severe 5 5	Perspiration acid/alk. change staining
ISO 2 4 3-4	II 4 4	ISO 3 4 4	ISO 4 5 5	Pleating conditions (steam) change staining
			ISO 2 4 3-4	Washing conditions change staining
Nylon: (AATCC) Daylight, 6; Washing II, 5 Nylon and Acrylics: Not recommended by some manufacturers because of poor yield			Woolskins, Furs, Thermoplastics	OTHER USES Textile
				Non-Textile
				NOTES

C.I. Disperse Yellow 36—39

C.I. Disperse Yellow	36	37		38
CHEMICAL CLASS		—		—
C.I. CONSTITUTION NO.		—		—
SUBSTRATE		ACETATE	POLYESTER	ACETATE
HUE		Bright Yellow	Bright Yellow	Bright Yellow
Artificial Light (tungsten)		unchanged	slightly redder	unchanged
DYEING				
Methods		N	Nc, (HT), T	N
Dyeing Properties				
Rate		moderate	—	moderate
Temp. range		moderate	—	moderate
Levelling		good	—	good
Build-up		moderate	—	good
Reservation	cotton	5	—	4
	viscose	5	—	3
	wool	1-2	—	1-2
PRINTING				
Fixation		AS	PS	AS
Dischargeability		x	—	—
FASTNESS				
Test Methods		A*	AATCC	A*
Dry Heat	conditions	—	—	—
	change	—	—	—
	staining	—	—	—
Light	source	daylight	daylight	daylight
	pale	7	7	5
	medium	—	—	—
	heavy	—	—	—
Nitrogen Oxides		3	5	3
Perspiration	acid/alk.	—	alkaline	—
	change	5	5	3
	staining	—	—	—
Pleating	conditions	—	—	—
(steam)	change	—	—	—
	staining	—	—	—
Washing	conditions	II	IV	II
	change	5	5	5
	staining	—	—	—
OTHER USES				
Textile		Nylon: (A*) Daylight, 6; Washing II, 5 Triacetate: Suitable		Nylon: (A*) Daylight, 4; Perspiration, 3
Non-Textile				
NOTES		*Tests according to AATCC methods 1949— see Colour Index, 2nd Edition		*Tests according to AATCC methods—see Colour In- dex, 2nd Edition

					C.I. Disperse Yellow
<div>—</div> <div>—</div>					CHEMICAL CLASS
					C.I. CONSTITUTION NO.
					SUBSTRATE
ACETATE	NYLON 6·6	TRIACETATE	POLYESTER	ACRYLIC	HUE
Yellow	Yellow	Yellow	Reddish Yellow	Yellowish Orange	Artificial Light (tungsten)
redder	redder, duller	redder	redder	redder	
N	N	N	HT, Nc	N	DYEING
					Methods
D—slow	very rapid	D—slow	HT	Nc	Dyeing Properties
D—moderate	good	D—moderate	—	—	Rate
C—good	good	C—good	moderate	—	Temp. range
B—very good	good	B—very good	v, good	good	Levelling
				moderate	Build-up
4	5	4	4	—	Reservation
4-5	5	4	4-5	—	cotton
2	3	1	1	—	viscose
					wool
AS	—	PS, (AS)	PS, (ASc)	—	PRINTING
x*	—	x	x	—	Fixation
					Dischargeability
ISO	ISO	ISO	ISO	ISO	FASTNESS
—	intermediate	intermediate	intermediate	—	Test Methods
—	5	5	4-5	—	Dry Heat
—	3	4	3-4	—	conditions
					change
daylight	daylight	daylight	daylight†	daylight	staining
6	6	6	6-7	6	Light
6-7	6	6-7	7	6-7	source
6-7	6	6-7	7	—	pale
					medium
5	5	5	5	—	heavy
					Nitrogen Oxides
alkaline	alkaline	alkaline	alkaline	alkaline	Perspiration
4	5	5	5	5	acid/alk.
3	3-4	5	5	5	change
					staining
—	severe	severe	intermediate	intermediate	Pleating
—	5	4-5	4-5	5	(steam)
—	2-3	3-4	5	4	conditions
					change
ISO2	ISO2	ISO3	ISO4	ISO2	staining
3	5	5	5	5	Washing
4-5	4	5	5	5	conditions
					change
					staining
†Polyester dyed with <i>o</i> -phenyl phenol carrier, heat aftertreated: daylight, 6, 6-7					OTHER USES
					Textile
					Non-Textile
*Suitable for illuminated discharges					NOTES

C.I. Disperse Yellow 40—47

C.I. Disperse Yellow	40	41	42		
CHEMICAL CLASS			Nitro		
C.I. CONSTITUTION NO.			10338		
SUBSTRATE			ACETATE	TRIACETATE	POLYESTER
HUE			Greenish Yellow redder	Yellow redder	Yellow redder
Artificial Light (tungsten)					
DYEING					
Methods			N	N	HT, T, (Nc)
Dyeing Properties					
Rate			E—very slow	D—slow	—
Temp. range			E—poor	E—poor	—
Levelling			D—moderate	B—very good	moderate
Build-up			C—good	B—very good	moderate†
Reservation	cotton		4-5	4-5	4
	viscose		4-5	5	4
	wool		3	1	2
PRINTING					
Fixation			AS	PS	PS, T, (ASc)
Dischargeability			3-4	2	x
FASTNESS					
Test Methods			ISO	AATCC	ISO
Dry Heat	conditions		—	—	inter.
	change		—	—	4
	staining		—	—	4
Light	source		day.	C. arc	day.
	pale		6	6-7	6-7
	medium		6-7	6-7	6-7
	heavy		7	7	7
Nitrogen Oxides			5	5	5
Perspiration	acid/alk.		alk.	alk.	alk.
	change		4-5	4-5	5
	staining		4	4	5
Pleating (steam)	conditions		30'/100C	—	inter.
	change		5	—	4-5
	staining		5	—	5
Washing	conditions		ISO 2	I	ISO 4
	change		4-5	5	4-5
	staining		4-5	4-5	5
OTHER USES					
Textile			Acrylic: Limited usage		
Non-Textile					
NOTES			†Polyester: Build-up poor with carrier.		

43	44	45	46	47		C.I. Disperse Yellow
Monoazo — POLYESTER Bright Greenish Yellow —	Monoazo — POLYESTER Bright Reddish Yellow sl. redder		— — —	— — ACETATE Reddish Yellow redder	— — NYLON Reddish Yellow redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
HT, T — — — — — — — — —	HT, T — — — — — — — — T —			N — — — poor — 4 — — —	N (90–95°C) — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 5–6 6 6–7 — — — — — — — ISO 4 5 5	ISO — — — daylight 5–6 6 6–7 — — — — — — — ISO 4 5 5	This C.I. Generic Name is discontinued. Dyes formerly listed under it now appear under C.I. Disperse Yellow 54	This C.I. Generic Name is discontinued. Dyes formerly listed under it now appear under C.I. Disperse Yellow 42	AATCC — — — Carbon arc 6 6–7 — — alkaline 5 4–5 — — — III 4–5 3–4	AATCC — — — Carbon arc 6–7 7 — — alkaline 5 5 — — — III 5 3–4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
						OTHER USES Textile Non-Textile
FP 1164365 FP 1187253	FP 1176871 FP 1187253					NOTES

C.I. Disperse Yellow 48—51

C.I. Disperse Yellow	48	49					
CHEMICAL CLASS		Methine					
C.I. CONSTITUTION NO.		—					
SUBSTRATE		ACETATE		TRIACETATE		POLYESTER	
HUE		Bright Greenish Yellow redder		Bright Greenish Yellow redder		Bright Greenish Yellow redder	
Artificial Light (tungsten)							
DYEING		N		Nc, HT†		HT†, Nc	
Methods							
Dyeing Properties							
Rate		—		—		—	
Temp. range		—		—		—	
Levelling		—		—		—	
Build-up		—		—		—	
Reservation	cotton	3-4		—		—	
	viscose	—		—		—	
	wool	3-4		—		—	
PRINTING		AS		PS, (AS)		PS, (ASc)	
Fixation		x		x		x	
Dischargeability							
FASTNESS							
Test Methods		ISO AATCC		ISO AATCC		ISO AATCC	
Dry Heat	conditions	— —		severe VI		severe VI	
	change	— —		4 5		3 5	
	staining	— —		4 4		1 4-5	
Light	source	daylight		daylight		daylight	
	pale	5		4-5		6	
	medium	6-7		6		7	
	heavy	7		6-7		8	
		7-8		7		7-8	
Nitrogen Oxides		— 5		5 5		5 5	
Perspiration	acid/alk.	alkaline		alkaline		alkaline	
	change	5 —		5 —		5 —	
	staining	4 —		5 —		4-5 —	
Pleating	conditions	— —		severe —		intermediate —	
(steam)	change	— —		5 —		5 —	
	staining	— —		4 —		4-5 —	
Washing	conditions	ISO 3 III		ISO 3 III		ISO 4 III	
	change	4-5 2-3		5 5		5 5	
	staining	4-5 4-5		5 5		5 5	
OTHER USES							
Textile							
Non-Textile							
NOTES		†For high temperature application to triacetate and polyester the bath should be made acid with acetic acid to prevent hydrolysis of the dye					

50								51	C.I. Disperse Yellow
Azo								Anthraquinone	CHEMICAL CLASS
								—	C.I. CONSTITUTION NO.
ACETATE		NYLON		TRIACETATE		POLYESTER		POLYESTER	SUBSTRATE
Bright Yellow		Bright Yellow		Bright Yellow		Bright Yellow		Greenish Yellow	HUE
little redder		redder		redder		redder		redder	Artificial Light (tungsten)
N		N		N, HT		HT, Nc		HT, Nc	DYEING
—		—		—		—		—	Methods
—		—		—		—		—	Dyeing Properties
—		—		—		moderate		—	Rate
—		—		—		good		—	Temp. range
3-4		—		3-4		4		4-5	Levelling
—		—		—		—		—	Build-up
3-4		—		3-4		3		2-3	Reservation
AS		AS		PS (AS)		PS, (ASc)		PS	cotton
—		—		—		—		—	viscose
									wool
									PRINTING
									Fixation
									Dischargeability
ISO	AATCC	ISO		ISO	AATCC	ISO		ISO	FASTNESS
mild	—	mild		mild	VI	inter.	—	intermediate	Test Methods
4-5	—	4-5		4-5	5	4	—	4	Dry Heat
4-5	—	4-5		4-5	3-4	3	—	3	conditions
daylight	C. arc	daylight		daylight	C. arc	daylight		daylight	change
3-4	1	4-5		3	1	6	4	7	staining
4-5	3	7		4-5	2	6-7	5	7	Light
6	4	—		6	4	6-7	6	—	source
5	5	5		—	5	5	—	—	pale
alkaline	—	alkaline		alkaline	—	alkaline	—	alkaline	medium
4-5	—	5		5	—	5	—	4-5	heavy
4	—	4		4-5	—	5	—	5	Nitrogen Oxides
—	—	—		inter.	inter.	inter.	—	—	Perspiration
—	—	—		5	5	5	—	—	acid/alk.
—	—	—		4-5	4-5	5	—	—	change
ISO1	III	ISO1		ISO3	III	ISO4		ISO3	staining
5	3-4	4-5		4-5	5	4-5		4-5	Pleating
4	1	3-4		4-5	3-4	4		5	(steam)
									conditions
									change
									staining
									Washing
									conditions
									change
									staining
									OTHER USES
									Textile
									Non-Textile
									NOTES

C.I. Disperse Yellow 52—58

C.I. Disperse Yellow		52, 53		54							
CHEMICAL CLASS											
C.I. CONSTITUTION NO.											
SUBSTRATE											
HUE											
Artificial Light (tungsten)		ACETATE		NYLON		TRIACETATE		POLYESTER			
		Bright Yellow		Bright Yellow		Bright Yellow		Bright Yellow			
		redder		redder		redder		redder			
DYEING											
Methods		N		N		(N) HT		HT, Nc, T			
Dyeing Properties											
Rate		—		—		—		—			
Temp. range		—		—		—		—			
Levelling		—		—		—		—		good (HT)	
Build-up		—		—		—		—			
Reservation		—		—		—		—		3-4	
cotton		—		—		—		—		—	
viscose		—		—		—		—		3	
wool		—		—		—		—			
PRINTING											
Fixation		—		—		—		—			
Dischargeability		—		—		—		—			
FASTNESS											
Test Methods											
Dry Heat		conditions		These C.I. Generic Names are discontinued		ISO		AATCC		ISO	
change		—				—		—		inter.	
staining		—				—		—		5	
		—				—		—		3-4	
Light		source		daylight		C. arc		daylight		C. arc	
pale		—		3-4		3		3-4		3	
medium		—		—		—		—		—	
heavy		—		—		—		—		—	
Nitrogen Oxides		—		5		—		5		—	
Perspiration		acid/alk.		alkaline		—		alkaline		—	
change		—		4-5		—		5		—	
staining		—		2-3		—		4-5		—	
Pleating		conditions		—		—		inter.		—	
(steam)		change		—		—		5		—	
staining		—		—		—		2-3		—	
Washing		conditions		ISO1		II		ISO3		II	
change		4-5		5		3-4		5		4-5	
staining		2		3-4		5		4-5		—	
OTHER USES											
Textile		Gives good solidity on triacetate/polyester blends									
Non-Textile		Acrylics: Light fastness (AATCC), 8									
NOTES		Major usage of this dye is for polyester									

55	56	57		58		C.I. Disperse Yellow	
	Disazo — POLYESTER Reddish Yellow unchanged	Azo — TRIACETATE Bright Greenish Yellow little change		Aminoketone — TRIACETATE Bright Yellow duller		POLYESTER Bright Yellow redder	
						CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)	
This C.I. Generic Name is discontinued. Dyes formerly listed under it now appear under C.I. Disperse Yellow 42	HT, T, Nc	N	HT, Nc, T	T, HT N (pale shades)	HT, T, Nc	DYEING Methods	
	—	moderate	—	Method N D—slow D—moderate A—excellent E—poor	—	Dyeing Properties Rate Temp. range Levelling Build-up	
	—	—	—	—	poor (HT) mod. (HT)†	Reservation cotton viscose wool	
	—	—	—	—	—	PRINTING Fixation Dischargeability	
	5	—	—	4	4		
	5	5	—	5	4-5		
	3-4	3-4	—	3	2		
	—	—	—	—	PS		
	—	—	—	—	×		
	ISO intermediate 4-5 4-5	AATCC — — —	AATCC V 2 —	Method HT ISO severe 5 4-5	ISO severe 5 4-5	FASTNESS Test Methods Dry Heat conditions change staining	
	day. Xe. arc 6 5 6-7 6 6-7 6	Carbon arc — 6-7 7	Carbon arc 5 6 7	daylight 4-5 5-6 6	daylight 6-7 6-7 7	Light source pale medium heavy	
	—	—	—	5	—	Nitrogen Oxides	
	alkaline 5 5	alkaline 5 5	— 5 —	alkaline 5 5	alkaline 5 5	Perspiration acid/alk. change staining	
	intermediate 4-5 5	— — —	— — —	severe 4 5	severe 5 5	Pleating (steam) conditions change staining	
	ISO 4 4-5 4-5	III 5 5	III 5 —	ISO 3 4 5	ISO 4 5 5	Washing conditions change staining	
	Wool/Poly-ester blends					OTHER USES Textile Non-Textile	
				†Build-up on polyester with carrier—poor		NOTES	

C.I. Disperse Yellow 59—63

C.I. Disperse Yellow		59				
CHEMICAL CLASS		Nitrodiphenylamine				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Yellow	Yellow	Yellow	Yellow	Yellow
Artificial Light (tungsten)		redder	redder	redder	redder	redder
DYEING						
Methods		N	N	Nc, (N)	HT, T, Nc	N
Dyeing Properties						
Rate		D—slow	moderate	C—moderate	moderate	slow
Temp. range		E—poor	poor	E—poor	poor	poor
Levelling		C—good	good	C—good	good	good
Build-up		C—good	good	C—good	good	poor
Reservation	cotton	—	—	—	—	—
	viscose	5	4-5	4-5	4-5	4
	wool	3-4	3	3	3	2
PRINTING						
Fixation		AS	AS	PS (AS)	PS (ASc)	—
Dischargeability		x	x	x	x	—
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	intermediate	intermediate	intermediate	—
	change	—	—	5	4	—
	staining	—	4-5	5	3-4	—
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	6	4	6	6	6
	medium	6-7	4-5	6-7	6-7	—
	heavy	7	4-5	7	7	—
Nitrogen Oxides		5	5	5	5	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	4-5	5	5	5
	staining	4	4	5	5	5
Pleating (steam)	conditions	—	intermediate	severe	severe	intermediate
	change	—	5	5	5	5
	staining	—	5	4	4	4
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 4	ISO 3
	change	4	4	4-5	5	5
	staining	4	4-5	4-5	5	5
OTHER USES		Major usage is on polyester, acetate and triacetate				
Textile						
Non-Textile						
NOTES						

60		61	62	63		C.I. Disperse Yellow
Monoazo 12712		Methine 48005	— —	Aminoketone —		CHEMICAL CLASS
TRIACETATE	POLYESTER	NYLON	POLYESTER	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Reddish Yellow redder	Reddish Yellow redder	Yellow —	Reddish Yellow —	Bright Greenish Yellow redder, duller	Bright Greenish Yellow redder, duller	SUBSTRATE
N	Nc, HT, T	N	HT, Nc	Nc, HT, T	HT, Nc, T	HUE Artificial Light (tungsten)
—	medium	—	slow	D—slow	HT Nc	DYEING
—	—	very good	good	E—poor	— —	Methods
—	—	very good	—	B—v. good	poor —	Dyeing Properties
—	very good	—	—	E—poor	mod. poor	Rate
—	3-4	—	4-5	3	— 3-4	Temp. range
—	3-4	—	4-5	5	— 5	Levelling
—	3-4	—	2	3-4	— 3	Build-up
PS, (AS) ✓	PS, (ASc) —	— —	— —	— ×	PS, T ×	Reservation cotton viscose wool
ISO — — —	ISO intermediate 4-5 3	ISO — — —	ISO intermediate 4-5 3-4	ISO severe 5 5	ISO severe 5 4-5	PRINTING Fixation Dischargeability
daylight — 6 —	daylight 6 7 7	daylight 3-4 4 4	daylight 6 6-7 7	daylight 4 4 —	daylight† 6 6-7 7	FASTNESS
—	—	—	—	5	5	Test Methods
alkaline 4-5 4	alkaline 5 5	alkaline 4 3-4	alkaline 5 5	alkaline 5 5	alkaline 5 5	Dry Heat conditions change staining
—	—	—	—	severe 4-5 5	severe 5 5	Light source pale medium heavy
ISO 3 4 4-5	ISO 4 5 4-5	ISO 1 4 3-4	ISO 3 5 5	ISO 3 5 5	ISO 4 5 5	Nitrogen Oxides
Acetate: Printing Acrylic: Also suitable				This dye gives shades which are slightly fluorescent		Perspiration acid/alk. change staining
						Pleating conditions (steam) change staining
						Washing conditions change staining
		Level dye- ing but poor light and wet fastness		†Polyester: Light fastness (when dyed with o-phenyl phenol car- rier; heat aftertreated), 5, 5		OTHER USES Textile
						Non-Textile
						NOTES

C.I. Disperse Yellow 64—67

C.I. Disperse Yellow		64				65
CHEMICAL CLASS		Quinoline				Anthraquinone
C.I. CONSTITUTION NO.		—				—
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER
HUE		Bright Yellow	Bright Yellow	Bright Yellow	Bright Yellow	Greenish Yellow
Artificial Light (tungsten)		little redder	redder	little redder	little redder	little redder
DYEING						
Methods		N	N	(Nc), HT	HT, Nc T (190°C)	T*
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	3-4	—	—	3-4	3-4
	viscose	4-5	—	—	4-5	—
	wool	1-2	—	—	1-2	—
PRINTING						
Fixation		—	—	—	—	—
Dischargeability		—	—	—	—	—
FASTNESS						
Test Methods		ISO	ISO	HT method ISO	HT method ISO	ISO
Dry Heat	conditions	—	intermediate	intermediate	intermediate	intermediate
	change	—	4	5	4-5	4-5
	staining	—	2-3	4	4	4-5
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	4	6	5	6-7	7
	medium	4	6-7	5	7	7
	heavy	4	6-7	5	7	7
Nitrogen Oxides		5	4-5	5	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	5	5	5	4-5
	staining	3	5	5	5	5
Pleating (steam)	conditions	—	intermediate	intermediate	intermediate	intermediate
	change	—	5	5	4-5	5
	staining	—	5	3	5	5
Washing	conditions	ISO1	ISO1	ISO3	ISO4	ISO3
	change	5	5	5	4-5	5
	staining	3-4	4-5	5	4-5	5
OTHER USES						
Textile						
Non-Textile						
NOTES						*Application only by thermofixation

66	67			C.I. Disperse Yellow
Monoazo — POLYESTER Yellow redder	Quinoline — ACETATE TRIACETATE POLYESTER Bright Yellow Bright Yellow Bright Yellow redder redder redder			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
HT, Nc — — — 4 4 2 PS, T —	N — — — — — — AS —	N — — — — — — PS —	HT, T, Nc — — — — — — PS, T —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO severe 5 4 daylight 6 7 7 — alkaline 5 5 — — — ISO 4 5 5	AATCC — — — Carbon arc — 4 — — — — — IIA 3 3	AATCC — — — Carbon arc — 4 — — — — IIA 4-5 5	AATCC II 4-5 5 Carbon arc — 6 — 5 alkaline 5 5 intermediate 5 5 III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Polyester: This is primary usage Acrylic: Pale dyeings only (light fastness, 7)			OTHER USES Textile Non-Textile
				NOTES

C.I. Disperse Yellow 68—72

C.I. Disperse Yellow		68				69
CHEMICAL CLASS		Disazo				Azo
C.I. CONSTITUTION NO.		—				—
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER
HUE		Reddish Yellow	Yellowish Orange	Reddish Yellow	Reddish Yellow	Reddish Yellow
Artificial Light (tungsten)		little redder	redder	redder, brighter	redder	—
DYEING						
Methods		N	N	N, HT, T	Nc, HT, T (190–210°C)	HT, Nc
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	3–4	—	5
	viscose	—	—	3	—	5
	wool	—	—	1	—	3
PRINTING						
Fixation		—	—	—	—	—
Dischargeability		—	—	—	—	—
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	AATCC
Dry Heat	conditions	—	severe	severe	severe	—
	change	—	5	4–5	4–5	—
	staining	—	4–5	4	4	—
Light	source	daylight	daylight	daylight	daylight	Carbon arc
	pale	5	5–6	5	6	—
	medium	6	5–6	5–6	6–7	5
	heavy	6–7	5–6	6	7	—
Nitrogen Oxides		5	5	5	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	—
	change	5	5	5	5	—
	staining	3	5	5	4–5	—
Pleating (steam)	conditions	—	intermediate	severe	severe	—
	change	—	5	4–5	5	—
	staining	—	5	5	4–5	—
Washing	conditions	ISO1	ISO1	ISO3	ISO4	III
	change	4–5	5	4–5	4–5	4–5
	staining	4–5	4	5	5	5
OTHER USES						
Textile						Nylon
Non-Textile						Acrylic
NOTES						

70		71	72		C.I. Disperse Yellow
Monoazo		Azo	Azo		CHEMICAL CLASS
TRIACETATE	POLYESTER	POLYESTER	NYLON	POLYESTER	C.I. CONSTITUTION NO.
—	—	Bright Greenish Yellow	Yellow	Bright Yellow	SUBSTRATE
redder	—	redder, duller	redder	redder, duller	HUE
					Artificial Light (tungsten)
Nc, HT	HT, T	HT, Nc	N	HT, Nc	DYEING Methods
slow	—	—	—	—	Dyeing Properties
poor	—	—	—	—	Rate
moderate	—	—	—	—	Temp. range
very good	very good	—	—	—	Levelling
—	—	—	—	—	Build-up
—	—	4-5	—	—	Reservation
—	—	—	—	4	cotton
				—	viscose
					wool
PS, (AS)	PS, T	—	—	—	PRINTING
x	x	—	—	—	Fixation
					Dischargeability
ISO intermediate	ISO intermediate	AATCC III	AATCC I	AATCC III	FASTNESS
4-5	5	—	4-5	—	Test Methods
4	4-5	3	3	2	Dry Heat
daylight	daylight	Carbon arc	Carbon arc	Carbon arc	conditions
4	5	7	4-5	4	change
4-5	5-6	7	5	4-5	staining
5-6	6	7	—	5-6	Light
5	5	—	—	—	source
alkaline	alkaline	alkaline	alkaline	alkaline	pale
4-5	5	5	4-5	5	medium
2-3	5	5	3	5	heavy
intermediate	severe	—	—	—	Nitrogen Oxides
5	5	—	—	—	Perspiration
4-5	5	—	—	—	acid/alk.
					change
ISO 3	ISO 4	II	II	II	staining
3-4	5	5	4	5	Pleating
3	5	5	1	5	(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
Nylon, Acrylic: Not recommended. Acetate: By printing only, light fastness, 4-5; Wash (2), 4-5, 4; persp., 5, 4					OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Yellow 73—81

C.I. Disperse Yellow	73	74	75	76	77
CHEMICAL CLASS	Polymethine	Monoazo	Monoazo	Azo	Anthraquinone
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	NYLON	NYLON	NYLON	POLYESTER	POLYESTER
HUE	Bright Greenish Yellow redder	Bright Yellow little redder	Reddish Yellow —	Reddish Yellow —	Bright Greenish Yellow much redder
Artificial Light (tungsten)					
DYEING					
Methods	N (95–98°C)	N (95–98°C)	N†	HT, T	T only
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	—	—	—	4	—
viscose	—	—	—	4	—
wool	—	—	—	2	—
PRINTING					
Fixation	AS	AS	AS	PS	T, PS
Dischargeability	×	✓	—	—	—
FASTNESS					
Test Methods	ISO	ISO	ISO	AATCC	ISO
Dry Heat	conditions	—	intermediate	III	severe
change	—	—	4–5	5	4–5
staining	—	—	5	4–5	3–4
Light	source	daylight	daylight	Carbon arc	daylight
pale	5–6	6	6	5	7
medium	6	6–7	6–7	5–6	7
heavy	6	6–7	7	5–6	7
Nitrogen Oxides	—	—	—	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
change	4–5	4–5	4	5	5
staining	3	4–5	3	5	5
Pleating	conditions	—	—	—	—
(steam)	change	—	—	—	—
staining	—	—	—	—	—
Washing	conditions	ISO 3	ISO 3	III	ISO 4
change	3–4	4	3–4	5	5
staining	3	3	4–5	5	4–5
OTHER USES					
Textile			Acetate, Triacetate, Polyester: Suitable for printing		
Non-Textile					
NOTES			†Dye from slightly acid bath		

78	79	80		81	C.I. Disperse Yellow
Azo — POLYESTER Bright Greenish Yellow redder, weaker	Azo — POLYESTER Bright Yellow little redder	Monoazo — TRIACETATE Yellow redder		Monoazo — NYLON Reddish Yellow redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
HT, Nc — — — — 3 3 2 PS —	HT, Nc — — — — — 4 —	Nc, HT — — — — — — —	HT, Nc — — — — 4 4 3 T, PS† —	N (95–100°C) — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC III — 3-4 Carbon arc 7 7 7 — alkaline 5 5 — — — II 5 5	AATCC III — 4 Carbon arc 4-5 5 — — alkaline 5 5 — — — II 5 5	ISO severe 4-5 3 daylight — 6-7 — 4 alkaline 5 4-5 — — — ISO1 5 5	ISO severe 4-5 3 daylight 6-7 7 7 — alkaline 5 4-5 intermediate 4-5 5 ISO4 5 4-5	ISO intermediate 5 5 daylight 6-7 7 7-8 — alkaline 4-5 5 — — — ISO3 4 3-4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Acetate: Printing					OTHER USES Textile Non-Textile
		†Steam fixation for pale depths Thermofixation for all depths			NOTES

C.I. Disperse Yellow 82—85

C.I. Disperse Yellow		82			
CHEMICAL CLASS		Methine			
C.I. CONSTITUTION NO.					
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER
HUE		Fluorescent Greenish Yellow redder, weaker	Fluorescent Greenish Yellow redder, weaker	Fluorescent Greenish Yellow redder, weaker	Fluorescent Greenish Yellow redder, weaker
	Artificial Light (tungsten)				
DYEING					
Methods		N†	N†	N†	Nc,† HT,† T
Dyeing Properties					
Rate		---	---	---	slow
Temp. range		---	---	---	---
Levelling		---	---	---	very good (HT)
Build-up		---	---	---	---
Reservation	cotton	---	---	---	3-4
	viscose	---	---	---	---
	wool	---	---	---	3-4
PRINTING					
Fixation		AS	AS	PS	PS
Dischargeability		x	x	x	x
FASTNESS					
Test Methods		ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	intermediate	intermediate	intermediate
	change	5	4-5	4-5	4-5
	staining	5	4	3-4	4
Light	source	daylight*	daylight*	daylight*	daylight*φ
	pale	2-3	3	3	3
	medium	3	3	3	4
	heavy	---	---	---	4
Nitrogen Oxides		2	1	1-2	2-3 (3 cycles)
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
	change	5	4-5	4	5
	staining	3-4	3-4	3-4	5
Pleating (steam)	conditions	---	---	---	severe
	change	---	---	---	3
	staining	---	---	---	5
Washing	conditions	ISO 1	ISO 1	ISO 3	ISO 4
	change	4-5	3-4	3	4-5
	staining	4	4	3-4	5
OTHER USES					
Textile					
Non-Textile					
NOTES		†Dye at pH 5 *Subject to catalytic fading when applied in admixture with certain anthraquinone blue dyes φLight fastness when dyed with o-phenyl phenol based carriers, 2, 3, 3			

83			84	85	C.I. Disperse Yellow
Azo —			Monoazo —	Monoazo —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Bright Yellow redder	TRIACETATE Yellow redder	POLYESTER Yellow redder	POLYESTER Reddish Yellow duller	POLYESTER Yellow redder	
N	N	Nc, HT, T	Nc, HT, T	T (200–220°C) (Nc)†	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool
— — — —	— — — —	— — — —	— — — —	— — — —	
— — —	— — —	— — —	4 — 4	4–5 — unsuitable†	
AS ×	PS ×	PS ×	— —	T —	PRINTING Fixation Dischargeability
ISO — — —	ISO — — —	ISO — — —	ISO — — —	ISO intermediate 5 4	FASTNESS Test Methods Dry Heat conditions change staining
daylight 5–6 6 —	daylight 5–6 5–6 —	daylight 6–7 6–7 7	daylight 6–7 6–7 —	daylight 5 6 —	Light source pale medium heavy
5	5	—	—	5	Nitrogen Oxides
alkaline 4–5 4	alkaline 4–5 4–5	alkaline 5 5	alkaline 5 5	alkaline 5 5	Perspiration acid/alk. change staining
— — —	— — —	— — —	— — —	severe 3–4 5	Pleating (steam) conditions change staining
ISO 3 4 3	ISO 3 5 4–5	ISO 4 4–5 4	ISO 3 4–5 5	ISO 4 5 5	Washing conditions change staining
Nylon: Poor fastness properties				Unsuitable for other man-made fibres	OTHER USES Textile Non-Textile
				†Hydrolysis of dye occurs in high tem- perature dyebaths (130°C) or in pres- ence of wool Dye at pH 5	NOTES

C.I. Disperse Yellow 86—88

C.I. Disperse Yellow		86					
CHEMICAL CLASS		Nitrodiphenylamine					
C.I. CONSTITUTION NO.		—					
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	
HUE		Reddish Yellow	Reddish Yellow	Reddish Yellow	Reddish Yellow	Yellowish Orange	
Artificial Light (tungsten)		little redder	little redder	little redder	little redder	little redder	
DYEING							
Methods		N	†see notes	N, (Nc)	Nc, HT, T	N	
Dyeing Properties							
Rate		D—slow	—	—	—	—	
Temp. range		E—poor	—	—	—	—	
Levelling		D—moderate	—	D—moderate	—	—	
Build-up		C—good	—	C—good	—	—	
Reservation	cotton	—	—	—	—	—	
	viscose	5	—	—	—	—	
	wool	4	—	—	4	—	
PRINTING							
Fixation		AS	AS	PS, (AS)	PS, (ASc), T	PS	
Dischargeability		×	×	×	×	×	
FASTNESS							
Test Methods		ISO AATCC	ISO	ISO AATCC	ISO AATCC	ISO	
Dry Heat	conditions	— —	mild	inter. —	inter. V	mild	
	change	— —	5	5 —	5 —	5	
	staining	— —	4-5	4-5 —	3 4-5	4-5	
Light	source	daylight C. arc	daylight	daylight C. arc	daylight C. arc	daylight	
	pale	6 6	5	7 6	6-7 6-7	6-7	
	medium	6-7 6-7	5	7 6-7	7 6-7	6-7	
	heavy	7 —	—	7 —	7 6-7	—	
Nitrogen Oxides		5 5	5	5 5	— —	—	
Perspiration	acid/alk.	alkaline alkaline	alkaline	alkaline alkaline	alkaline alkaline	alkaline	
	change	5 5	5	5 5	5 5	5	
	staining	4 5	5	5 5	5 5	5	
Pleating	conditions	— —	intermediate	inter. —	inter. —	intermediate	
(steam)	change	— —	4-5	5 —	5 —	4-5	
	staining	— —	4	5 —	4-5 —	4-5	
Washing	conditions	ISO 2 II	ISO 2	ISO 3 —	ISO 4 —	ISO 2	
	change	4-5 3	4-5	4-5 —	5 —	5	
	staining	4 3	4	4-5 —	5 —	5	
OTHER USES							
Textile							
Non-Textile							
NOTES		†Not recommended for dyeing; suitable for printing					

87		88		C.I. Disperse Yellow
Methine		Methine		CHEMICAL CLASS
TRIACETATE	POLYESTER	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Greenish Yellow redder	Greenish Yellow redder	Bright Greenish Yellow redder	Bright Greenish Yellow redder	SUBSTRATE
				HUE
				Artificial Light (tungsten)
Nc (pH 4-5)	Nc (pH 4-5) HT (pH 4-5)	Nc (pH 5)	Nc, HT (pH 5) T	DYEING
—	—	—	—	Methods
—	—	—	—	Dyeing Properties
—	—	—	—	Rate
—	—	—	—	Temp. range
—	—	—	—	Levelling
—	—	—	—	Build-up
—	4	—	4-5	Reservation
—	4-5	—	4	cotton
—	2	—	3	viscose
PS	PS	PS	PS	wool
x	x	x	x	PRINTING
				Fixation
				Dischargeability
AATCC	AATCC	AATCC	AATCC	FASTNESS
V	V	V	V	Test Methods
3	4	4	4-5	Dry Heat
Carbon arc	Carbon arc	Carbon arc	Carbon arc	conditions
5-6	6-7	6	6-7	change
6	7	6	6-7	staining
—	—	—	—	Light
—	—	—	—	source
alkaline	alkaline	alkaline	alkaline	pale
5	5	5	5	medium
4	5	—	—	heavy
—	—	—	—	Nitrogen Oxides
—	—	—	—	Perspiration
—	—	—	—	acid/alk.
—	—	—	—	change
III	III	III	III	staining
4-5	5	5	5	Pleating
3-4	5	5	5	(steam)
				conditions
				change
				staining
				Washing
				conditions
				change
				staining
				OTHER USES
				Textile
				Non-Textile
		Suitable for fabrics to be given durable press finish		NOTES

C.I. Disperse Yellow 89—91

C.I. Disperse Yellow	89				90		
CHEMICAL CLASS	Methine				Methine		
C.I. CONSTITUTION NO.	—				—		
SUBSTRATE	ACETATE	TRIACETATE		ACETATE	TRIACETATE	POLYESTER	
HUE	Bright Greenish Yellow redder, duller	Bright Greenish Yellow redder, duller		Bright Greenish Yellow redder	Bright Greenish Yellow redder	Bright Greenish Yellow redder	
Artificial Light (tungsten)							
DYEING							
Methods	N†	Nc†		N†	N, Nc†	Nc, (HT)†	
Dyeing Properties							
Rate	C—moderate	D—slow		D—slow	—	—	
Temp. range	B—very good	—		E—poor	—	—	
Levelling	B—very good	—		D—moderate	—	—	
Build-up	D—moderate	D—moderate		B—very good	—	—	
Reservation							
cotton	—	—		—	—	—	
viscose	4-5	4-5		—	—	—	
wool	2-3	2-3		—	—	—	
PRINTING							
Fixation	—	—		AS	PS, (AS)	PS, (ASc)	
Dischargeability	x	x		x	x	x	
FASTNESS							
Test Methods	ISO	AATCC	ISO	AATCC	ISO	ISO	ISO
Dry Heat	conditions	—	inter.	—	mild	intermediate	intermediate
change	—	—	5	—	5	5	4-5
staining	—	—	4-5	—	4-5	4-5	3-4
Light	source	daylight	daylight	daylight	Xenon arc	daylight	daylight
pale	6	C. arc	5-6	C. arc	6	6	5-6
medium	6-7	7	6	6-7	6-7	6-7	6-7
heavy	6-7	—	—	—	7	6-7	6-7
Nitrogen Oxides	5	5	5	5	5	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	5	5	5
staining	3-4	5	4	5	4	4-5	4-5
Pleating	conditions	—	inter.	—	mild	intermediate	severe
(steam)	change	—	5	—	5	5	4-5
staining	—	—	4-5	—	4-5	5	5
Washing	conditions	ISO 2	ISO 3	ISO 3	ISO 2	ISO 3	ISO 4
change	4	II	4	II	5	4-5	4-5
staining	4	4-5	3-4	5	3-4	4	5
OTHER USES							
Textile	Nylon, Polyester, Acrylic: Poor affinity						
Non-Textile	Woolskins				Woolskins		
NOTES	†Hydrolysis occurs in alkaline dye liquors; dye at pH 4-6				†Hydrolysis occurs in alkaline dye liquors; dye at pH 5-6		

91					C.I. Disperse Yellow
Methine					CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	C.I. CONSTITUTION NO.
Greenish Yellow redder, duller	Greenish Yellow redder	Greenish Yellow redder, duller	Greenish Yellow redder, duller	Greenish Yellow redder, duller	SUBSTRATE
					HUE
					Artificial Light (tungsten)
printing only	N	printing only	printing only	printing only	DYEING
—	—	—	—	—	Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
—	—	—	—	—	Levelling
—	—	—	—	—	Build-up
—	—	—	—	—	Reservation
—	—	—	—	—	cotton
—	—	—	—	—	viscose
—	—	—	—	—	wool
AS ×†	AS ×†	PS ×†	PS ×†	PS ×†	PRINTING
					Fixation
					Dischargeability
ISO mild 5 5	ISO severe 4 2	ISO intermediate 5 5	ISO intermediate 5 3	ISO mild 5 4-5	FASTNESS
daylight	daylight	daylight	daylight	daylight	Test Methods
—	5-6	—	—	—	Dry Heat
6	6	6-7	6-7	4	conditions
—	6-7	—	—	—	change
3	5	3	5	5	staining
alkaline	alkaline	alkaline	alkaline	alkaline	Light
5	4-5	5	5	5	source
4-5	4	5	4-5	4-5	pale
—	severe	—	—	—	medium
—	4-5	—	—	—	heavy
—	4	—	—	—	Nitrogen Oxides
ISO1	ISO3	ISO3	ISO3	ISO3	Perspiration
5	3	4-5	5	4	acid/alk.
5	3-4	5	5	5	change
					staining
					Pleating
					(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
					Textile
					Non-Textile
					NOTES

†Suitable for illuminated discharges

C.I. Disperse Yellow 92—97

C.I. Disperse Yellow	92		93	
CHEMICAL CLASS	Anthraquinone		Methine	
C.I. CONSTITUTION NO.	—		—	
SUBSTRATE	TRIACETATE	POLYESTER	TRIACETATE	POLYESTER
HUE	Greenish Yellow	Greenish Yellow	Greenish Yellow	Greenish Yellow
Artificial Light (tungsten)	redder	redder	redder	redder
DYEING				
Methods	T (190–220°C)	T (190–220°C)	N	HT, Nc
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	—	—	—	—
Reservation				
cotton	—	—	5	—
viscose	—	—	5	—
wool	—	—	3–4	—
PRINTING				
Fixation	not suitable	not suitable	—	—
Dischargeability	—	—	—	—
FASTNESS				
Test Methods				
Dry Heat	conditions	ISO	ISO	ISO
change	intermediate	intermediate	severe	severe
staining	4–5	4–5	4–5	4
	4–5	4	3	2–3
Light	source	daylight	daylight	daylight
pale	daylight	6	—	7
medium	6–7	6–7	7	7–8
heavy	—	7	—	7–8
Nitrogen Oxides	5	—	4	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline
change	4–5	4–5	5	5
staining	5	5	4–5	4–5
Pleating	conditions	—	—	—
(steam)	change	—	—	—
staining	—	—	—	—
Washing	conditions	ISO3	ISO3	ISO4
change	4–5	4	5	5
staining	5	3–4	4–5	4
OTHER USES				
Textile				
Non-Textile				
NOTES				

94	95	96	97	C.I. Disperse Yellow
Azo — POLYPROPYLENE* Yellow redder	Azo — POLYPROPYLENE* Reddish Yellow little redder	Azo — POLYPROPYLENE* Reddish Yellow little redder	Azo 12055 POLYPROPYLENE* Reddish Yellow little redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
1 hr at pH 5-6 and temperatures 60- 100°C — — — — 4 — 3 — —	1 hr at pH 5-6 and temperatures 60- 100°C — — — — 5 — 4 — —	1 hr at pH 5-6 and temperatures 60- 100°C — — — — 5 — 3 — —	1-1½ hrs at 95- 100°C — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO 30sec/130°C 5 5 daylight 6-7 7 7 5 alkaline 4-5 5 — — — ISO 3 4 4	ISO 30sec/130°C 5 5 daylight 6-7 7 7 5 alkaline 5 5 — — — ISO 3 4-5 4-5	ISO 30sec/130°C 5 5 daylight 6 6-7 7 5 alkaline 4-5 5 — — — ISO 3 4-5 4-5	ISO — — — daylight — 4-5 — — — — — ISO 3 3 3-4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
			C.I. Solvent Yellow 14	OTHER USES Textile Non-Textile
*Nickel modified fibre	*Nickel-modified fibre	*Nickel-modified fibre	*Unmodified fibre. Dry cleaning fastness very poor	NOTES

C.I. Disperse Yellow		98				
CHEMICAL CLASS		Azo				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Yellow	Dull Yellowish Brown redder	Yellow redder	Reddish Yellow redder	Dull Reddish Yellow redder
Artificial Light (tungsten)		redder				
DYEING						
Methods		printing only	printing only	Nc, HT, T	Nc, HT, T	printing only
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	—	—	—
	viscose	—	—	2	2	—
	wool	—	—	3-4	3-4	—
PRINTING						
Fixation		AS	AS	PS, (AS)	PS, (ASc)	PS
Dischargeability		—	—	√	√	—
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	—	severe	severe	mild
	change	5	—	4-5	4-5	4-5
	staining	5	—	3-4	2-3	4
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	—	—	6-7	6	—
	medium	6-7	4	6-7	7	4
	heavy	—	—	7	7	—
Nitrogen Oxides		5	—	4-5	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	3-4	3-4	5	5	4
	staining	4-5	3-4	4-5	5	4-5
Pleating	conditions	—	—	severe	severe	—
(steam)	change	—	—	4-5	4	—
	staining	—	—	3-4	4	—
Washing	conditions	ISO 1	ISO 3	ISO 4	ISO 4	ISO 3
	change	4	1	2-3	4	2
	staining	4-5	2	3-4	3-4	4
OTHER USES						
Textile						
Non-Textile						
NOTES						

99		100	101	102		C.I. Disperse Yellow
Methine		Azo	Benzimidazole	Azo		CHEMICAL CLASS
—		—	—	—		C.I. CONSTITUTION NO.
TRIACETATE	POLYESTER	POLYESTER	POLYESTER	TRIACETATE	POLYESTER	SUBSTRATE
Bright Green- ish Yellow redder	Bright Green- ish Yellow redder	Fluorescent Greenish Yellow redder, duller	Fluorescent Greenish Yellow redder	— —	— —	HUE Artificial Light (tungsten)
HT, Nc	HT, T	Nc	Nc,* HT, T (200–210°C)	Nc, HT	HT, T	DYEING Methods
— — —	— — —	— — —	— — —	B—rapid D—moderate — C—good	— — —	Dyeing Properties Rate Temp. range Levelling Build-up
— — —	— — —	— — —	— — 1	— — 2	— — —	Reservation cotton viscose wool
T x	PS, T x	— —	PS, T —	PS (AS) √	PS, T —	PRINTING Fixation Dischargeability
ISO intermediate 4–5 5	ISO — — —	AATCC III 5 4	ISO severe 5 4–5	ISO severe 4 2–3	ISO intermediate 4–5 4	FASTNESS Test Methods
daylight 4–5 5–6 7	daylight 6–7 6–7 7–8	Carbon arc — 2 —	daylight† 5–6 6–7 6–7	daylight 5–6 6 —	daylight 7 7 7	Dry Heat conditions change staining
5	5	—	—	5	5	Light source pale medium heavy
alkaline 5 5	alkaline 5 5	— — —	alkaline 5 5	alkaline 5 5	alkaline 5 5	Nitrogen Oxides
— — —	— — —	— — —	— — —	— — —	— — —	Perspiration acid/alk. change staining
ISO 3 4–5 5	ISO 3 5 5	II 5 5	ISO 4 5 5	ISO 4 4 5	ISO 4 5 5	Pleating conditions (steam) change staining
				Acetate: Suitable for printing		Washing conditions change staining
						OTHER USES Textile
						Non-Textile
			*Not with o- phenyl phenol (light fastness much reduced) †Subject to cat- alytic fading in admixture with other dyes			NOTES

C.I. Disperse Yellow 103—110

C.I. Disperse Yellow	103	104	105		
CHEMICAL CLASS	Azo	Azo	Xanthene		
C.I. CONSTITUTION NO.	—	—	—		
SUBSTRATE	POLYESTER	POLYESTER	ACETATE	TRIACETATE	POLYESTER
HUE	Greenish Yellow	Reddish Yellow	Bright Greenish Yellow	Bright Greenish Yellow	Bright Greenish Yellow
Artificial Light (tungsten)	redder	—	redder	redder	redder
DYEING					
Methods	(Nc), (HT) T (200–210°C)	HT	N	N, HT, T	Nc, HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	3	—	—
PRINTING					
Fixation	—	PS	—	—	—
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods					
Dry Heat	ISO	AATCC	ISO	ISO	ISO
conditions	intermediate	—	—	—	—
change	5	—	—	—	—
staining	4–5	—	—	—	—
Light	daylight	Carbon arc	daylight	daylight	daylight
source	7	7	6	6	7
pale	7	7–8	6–7	6	7
medium	7	7–8	—	—	—
heavy	7	7–8	—	—	—
Nitrogen Oxides	—	—	5	5	5
Perspiration	alkaline	—	alkaline	alkaline	alkaline
acid/alk.	4–5	—	4	4	5
change	5	—	5	5	5
staining	—	—	—	—	—
Pleating	—	—	—	—	—
(steam)	—	—	—	—	—
change	—	—	—	—	—
staining	—	—	—	—	—
Washing	ISO 4	III	—	—	ISO 4
conditions	5	5	—	—	5
change	5	5	—	—	5
staining	—	—	—	—	—
OTHER USES					
Textile	Acetate, Triacetate	Acetate, Triacetate	Nylon: Unsuitable (poor light fastness)		
Acrylic		Nylon			
Non-Textile					
NOTES					

106	107	108		109	110	C.I. Disperse Yellow
Monoazo-anthraquinone —	Monoazo —	— —		Methine —	Azo —	CHEMICAL CLASS
POLYESTER	POLYESTER	ACETATE	POLYESTER	POLYESTER	POLYPROPYLENE*	C.I. CONSTITUTION NO.
Reddish Yellow redder	Yellow —	Reddish Yellow little redder	Reddish Yellow little redder	Greenish Yellow redder	Yellow redder	SUBSTRATE
						HUE Artificial Light (tungsten)
T	Nc, T	N	(Nc), HT, T	HT	1 hr at 97–100°C	DYEING Methods
—	—	—	—	—	—	Dyeing Properties
—	—	—	—	—	—	Rate
—	—	—	—	—	—	Temp. range
—	—	—	—	—	—	Levelling
—	—	—	5	—	—	Build-up
—	—	—	4–5	—	—	Reservation
—	—	—	—	—	—	cotton viscose wool
T	—	AS	PS	PS	—	PRINTING
—	—	×	×	—	—	Fixation Dischargeability
AATCC IV 5 4–5		AATCC — — —	AATCC — — —	AATCC — — —	AATCC 30 sec/120°C 5 4–5	FASTNESS Test Methods
Carbon arc 8 8 —		Carbon arc 5–6 — —	Carbon arc 5 5 —	Carbon arc 7 7–8 7–8	Carbon arc — 4–5 —	Dry Heat conditions change staining
5		5	5	—	—	Light source pale medium heavy
alkaline 4–5 5		— — —	— — —	— — —	— 4–5 4	Nitrogen Oxides
—		—	—	—	—	Perspiration acid/alk. change staining
—		—	—	—	—	Pleating conditions (steam) change staining
—		—	—	—	—	Washing conditions change staining
III 4–5 5		— — —	— — —	III 5 5	II 5 5	
		Nylon Triacetate: Light fastness, 5, 6				OTHER USES Textile
						Non-Textile
Unsuitable for exhaust dyeing		Good fastness to durable press finishing Stable pH 4–9			*Unmodified fibre	NOTES

C.I. Disperse Yellow 111—118

C.I. Disperse Yellow	111	112	113	114	
CHEMICAL CLASS	Azo	Azo	Azo	Azo	
C.I. CONSTITUTION NO.	—	—	—	—	
SUBSTRATE	POLYPROPYLENE*	POLYPROPYLENE*	POLYESTER	TRIACETATE	POLYESTER
HUE	Reddish Yellow	Yellow	Yellow	Bright Greenish Yellow	Bright Greenish Yellow
Artificial Light (tungsten)	redder	redder	redder	redder	redder
DYEING					
Methods	1 hr at 97–110°C	1 hr at pH 5–6 and 97–100°C	Nc, HT	(N), Nc, HT, T	Nc, HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	moderate	—	—	—	—
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	3–4	—
PRINTING					
Fixation	—	—	—	—	—
Dischargeability	—	—	—	✓	—
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	ISO	ISO
Dry Heat	30 sec/120°C	30 sec/120°C	III	intermediate	intermediate
conditions	5	—	5	5	5
change	3–4	5	4	5	4–5
staining					
Light	Carbon arc	Carbon arc	Carbon arc	daylight	daylight
source	5	4	4–5	6–7	6–7
pale	—	7	5–6	7	7
medium	—	—	6	7	7
heavy					
Nitrogen Oxides	—	—	—	—	—
Perspiration	acid/alk.	—	alkaline	alkaline	alkaline
change	4	5	5	4–5	4–5
staining	3–4	5	5	—	—
Pleating (steam)	conditions	—	—	intermediate	severe
change	—	—	—	4–5	4–5
staining	—	—	—	5	5
Washing	conditions	III	II	ISO 3	ISO 4
change	II	5	5	4–5	4–5
staining	3–4	5	5	5	4–5
	5				
OTHER USES					
Textile					
Non-Textile					
NOTES	*Unmodified fibre	*Metal-modified fibre		Stable pH 2–8	

115		116		117	118	C.I. Disperse Yellow	
Monomers		Monomers		Monomers	Monomers	CHEMICAL CLASS	
ACETATE		ACETATE		POLYESTER		C.I. CONSTITUTION NO.	
TRIACETATE		TRIACETATE		POLYESTER		SUBSTRATE	
Bright Yellow redder		Bright Greenish Yellow redder		Yellow redder		HUE	
No. HT		No. HT		No. HT		Ambient Light (tungsten)	
---		---		---		DYEING	
---		---		---		Memoria	
---		---		---		Dyeing Properties	
---		---		---		Rate	
---		---		good		Temp. range	
---		---		---		Leveling	
---		---		---		Build-up	
---		---		---		Reservation	
---		---		---		cotton	
---		---		---		viscose	
---		---		---		wool	
---		---		---		PRINTING	
---		---		---		Fastness	
---		---		---		Dischargeability	
---		---		---		FASTNESS	
---		---		---		Test Methods	
---		---		---		Dry Heat	
---		---		---		condensate	
---		---		---		change	
---		---		---		staining	
---		---		---		Light	
---		---		---		source	
---		---		---		pale	
---		---		---		medium	
---		---		---		heavy	
---		---		---		Nitrogen Oxides	
---		---		---		Perparation	
---		---		---		acid/alk.	
---		---		---		change	
---		---		---		standing	
---		---		---		Fleeting	
---		---		---		condensate	
---		---		---		change	
---		---		---		staining	
---		---		---		Washing	
---		---		---		condensate	
---		---		---		change	
---		---		---		staining	
---		---		---		OTHER USES	
---		---		---		Textile	
---		---		---		Non-Textile	
†Dye at pH 5-6		†Dye at pH 4-5		NOTES			

C.I. Disperse Yellow 119—121

C.I. Disperse Yellow	119	120	121	
CHEMICAL CLASS	Monoazo	Aminoketone	Aminoketone	
C.I. CONSTITUTION NO.	—	—	—	
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	
HUE	Greenish Yellow	Yellow	Bright Greenish Yellow	
Artificial Light (tungsten)	redder, duller	—	—	
DYEING				
Methods	HT, Nc	Nc, HT, T	HT, T, Nc	
Dyeing Properties				
Rate	—	—	—	
Temp. range	—	—	—	
Levelling	good at 130°C	—	—	
Build-up	v. good at 130°C	—	—	
Reservation				
cotton	5	—	—	
viscose	5	—	—	
wool	2-3	—	—	
PRINTING				
Fixation	PS	PS	PS	
Dischargeability	—	—	—	
FASTNESS				
Test Methods	ISO	AATCC	AATCC	
Dry Heat	conditions	—	III	
change	5	—	5	
staining	4	—	4-5	
Light	source	Carbon arc	Carbon arc	
pale	daylight†	6-7	4-5	
medium	6-7	7	5	
heavy	6-7	—	—	
Nitrogen Oxides	—	—	—	
Perspiration	acid/alk.	alkaline	alkaline	
change	5	5	5	
staining	5	5	5	
Pleating	conditions	—	—	
(steam)	change	—	—	
staining	5	—	—	
Washing	conditions	III	III	
change	ISO 4	5	5	
staining	5	—	—	
OTHER USES				
Textile		Dyeing, Printing of acetate and triacetate		
Non-Textile				
NOTES	†Daylight fastness (dyed with o-phenyl phenol carrier; heat aftertreated): 4-5			

C.I. Disperse Orange 1—2

C.I. Disperse Orange		1				2
CHEMICAL CLASS		Azo				Nitro
C.I. CONSTITUTION NO.		11080				—
SUBSTRATE		ACETATE	NYLON 6-6	TRIACETATE	POLYESTER	ACETATE
HUE		Reddish Orange	Bluish Red	Orange	Dull Orange	Bright Yellowish Orange
Artificial Light (tungsten)		unchanged	unchanged	unchanged	unchanged	unchanged
DYEING						
Methods		N	N	N	HT, Nc	N
Dyeing Properties						
Rate		D—slow	slow	D—slow	moderate	moderate
Temp. range		E—poor	poor	E—poor	moderate	good
Levelling		C—good	moderate	C—good	moderate	—
Build-up		C—good	good	C—good	good	good
Reservation		—	—	—	—	5
cotton		5	4-5	4-5	4-5	5
viscose		3	3	3	3	3-4
wool						
PRINTING						
Fixation		AS	AS	PS, (As)	PS, (ASc)	AS
Dischargeability		✓	✓	✓	—	x
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	B*
Dry Heat		mild	intermediate	severe	severe	—
conditions		5	4	4-5	4-5	—
change		4-5	3	4	3	—
staining						
Light		daylight	daylight	daylight	daylight	daylight
source		4-5	4	4	4-5	6-7
pale		5-6	4	4-5	5	7
medium		6	4-5	5-6	5	7
heavy						
Nitrogen Oxides		4-5	5	4-5	5	5
Perspiration		alk.	alk.	alk.	alk.	alk.
acid/alk.		5	5	5	5	4
change		3-4	3-4	4	5	3
staining						
Pleating		mild	intermediate	intermediate	severe	—
(steam)		5	4	5	5	—
change		4-5	4-5	4-5	3-4	—
staining						
Washing		ISO 2	ISO 2	ISO 3	ISO 4	—
conditions		3-4	4	4	4-5	2
change		3	3	4	4-5	2
staining						
OTHER USES		Acrylics: Applicable in pale depths; dyeing properties poor, (ISO): Daylight, 4, 4-5; washing (ISO 3), 5, 5 Polyvinylchloride fibres: Suitable Wool Sheepskins and Furs Thermoplastics: Surface dyeing				Nylon: Light fastness lower than on acetate
Textile						
Non-Textile						
NOTES		Literature: <i>Vickerstaff</i> , 273, 368, 371, 375 <i>Bird, JSDC</i> , 70 (1954) 74, 76				BP 305560 BP 305566 *For details of Tests See Colour Index, 2nd Ed.

C.I. Disperse Orange 3—5

C.I. Disperse Orange		3 and 3:1					4
CHEMICAL CLASS		Azo					
C.I. CONSTITUTION NO.		11005 (3:1 is similar)					
SUBSTRATE		ACETATE	NYLON 6-6	TRIACETATE	POLYESTER	ACRYLIC	
HUE		Orange	Yellowish Red	Orange	Orange	Orange	
Artificial Light (tungsten)		sl. redder	Red brighter	sl. redder	redder	redder	
DYEING Methods		N, (Nd)	N	N	HT, N*	N	
Dyeing Properties							
Rate		B—rapid	moderate	B—rapid	HT	rapid	
Temp. range		C—good	good	C—good	very rapid	good	
Levelling		B—v. good	good	B—v. good	very good	excellent	
Build-up		B—v. good	v. good	B—v. good	excellent	very good	
Reservation	cotton	3-4	—	3-4	3-4	—	
	viscose	4-5	4	3-4	4	4	
	wool	2-3	3	2-3	3	3	
PRINTING							
Fixation		AS	AS	PS, (AS)	PS, (ASc)	PS, (AS)	This C.I. Generic Name is discontinued
Dischargeability		✓	✓	✓	—	—	
FASTNESS							
Test Methods		ISO AATCC	ISO	ISO	ISO	ISO	
Dry Heat	conditions	— —	intermediate	intermediate	intermediate	mild	
	change	— —	2-3	4-5	4	4	
	staining	— —	3	3	2	4	
Light	source	day. C. arc	daylight	daylight	daylight	daylight	
	pale	4 4	3-4	4	5	5	
	medium	4-5 5	4	4-5	5-6	5-6	
	heavy	5 6	4-5	5	6	6	
Nitrogen Oxides		3-4 5	4-5	3	5	5	
Perspiration	acid/alk.	alk. alk.	alk.	alk.	alk.	alk.	
	change	5 4-5	4	5	4-5	5	
	staining	2-3 2	3	3-4	5	4-5	
Pleating (steam)	conditions	— —	intermediate	intermediate	intermediate	intermediate	
	change	— —	4	5	4-5	4	
	staining	— —	2-3	3	3-4	3	
Washing	conditions	ISO 2 II	ISO 2	ISO 2	ISO 4	ISO 3	
	change	3 4	3-4	4-5	4-5	4-5	
	staining	3 3	2-3	3-4	3-4	5	
OTHER USES							
Textile		Acetate and Polyester: can be diazotised and developed with C.I. Developer 8 to give bluish reds. ISO Tests: Acetate, daylight, 3-4, 3-4, 4; washing (ISO 2), 5, 5. Polyester, daylight, 6-7; steam pleat, 3, 4-5; washing (ISO 4), 5, 4-5					
Non-Textile		Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics; in pure state for colouration of resins C.I. Solvent Orange 9					
NOTES		*Applicable to polyester fibres at the boil without carrier This dye is slightly phototropic—references, Von Mechel & Stauffer, <i>Helv. Chim. Acta.</i> , 24 (1941), 151E; Stearns, <i>J. Opt. Soc. Amer.</i> , 32 (1942), 282 Literature: <i>Vickerstaff</i> , 273, 368, 371, 372, 375 Bird, <i>JSDC</i> , 70 (1954), 74, 76					

5							C.I. Disperse Orange	
Azo 11100							CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)	
ACETATE Dull Reddish Orange little redder		NYLON Dull Yellowish Red yellower		TRIACETATE Dull Reddish Orange little redder		POLYESTER Dull Yellowish Red brighter	ACRYLIC Dull Reddish Orange yellower	
N B—rapid B—very good C—good A—excellent 4-5 4-5 2-3 AS ✓		N rapid good very good very good 4-5 4-5 2-3 AS ✓		N, HT B—rapid B—very good C—good B—good 3-4 4-5 2-3 PS, (AS) —		Nc, HT, T moderate good good good 4 4 1-2 PS, (ASc) —	N moderate good good mod-good — 4 3 PS —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — —	AATCC — — —	ISO inter. — 3	AATCC — — —	ISO intermediate 4-5 4-5	ISO inter. 5 3-4	AATCC — — —	ISO intermediate — 3-4	FASTNESS Test Methods Dry Heat conditions change staining
day. 4-5 5 5-6	C. arc 5 5-6 6	day. 3 3-4 4	C. arc 1-2 2-3 —	daylight 4 4-5 5	day. 4-5 4-5 5	C. arc — 4 4-5	daylight 5 5 —	Light source pale medium heavy
4-5 alk. 4-5 3-4	4-5 alk. 4-5 3-4	5 alk. 4-5 3	— alk. — 2	5 alkaline 4-5 4	5 alk. 4-5 5	— alk. 4-5 —	5 alkaline 5 5	Nitrogen Oxides Perspiration acid/alk. change staining
— — —	— — —	severe 5 3	— — —	severe 5 3	inter. 5 4-5	— — —	intermediate 4-5 4	Pleating (steam) conditions change staining
ISO 2 4 3-4	I 4-5 4-5	ISO 2 4-5 3-4	II 3-4 4-5	ISO 3 4 4	ISO 4 5 4-5	III 3-4 5	ISO 2 4-5 4-5	Washing conditions change staining
Woolskins and Furs Plastics: Surface dyeing of thermoplastics							OTHER USES Textile Non-Textile	
Literature: <i>Vickerstaff</i> , 273							NOTES	

C.I. Disperse Orange 6—8

C.I. Disperse Orange	6		7				
CHEMICAL CLASS	—		Azo				
C.I. CONSTITUTION NO.	—		11240				
SUBSTRATE	ACETATE	NYLON	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE	Bright Red-dish Orange yellower	Bright Red-dish Orange yellower	Bright Orange redder, brighter	Dull Red little yellower	Bright Orange redder, brighter	Bright Orange little change	Orange little change
Artificial Light (tungsten)							
DYEING							
Methods	N	N	N, DD*	N	N	Nc, HT	N
Dyeing Properties							
Rate	slow	—	B—rapid	rapid	B—rapid	rapid	rapid
Temp. range	poor	—	C—good	good	C—good	good	good
Levelling	good	—	B—v. good	very good	B—very good	very good	v. good
Build-up	moderate	—	B—v. good	moderate	B—very good	very good	good
Reservation	cotton	—	—	—	—	—	—
viscose	4-5	—	4	4	4	4	3-4
wool	2	—	3	3	3	3	2-3
PRINTING							
Fixation	AS	AS	AS	AS	PS	PS	PS
Dischargeability	×	×	✓	✓	✓	—	—
FASTNESS							
Test Methods	A*	A*	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	—	intermediate	intermediate	intermediate	inter.
change	—	—	—	—	—	—	—
staining	—	—	—	2	2	2	2
Light	source	daylight	daylight	daylight	daylight	daylight	daylight
pale	—	—	4-5	4	4	5-6	4-5
medium	6	5	5	4	4-5	5-6	5
heavy	—	—	5	4-5	5	6	5-6
Nitrogen Oxides	1	5	3	4-5	3	5	5
Perspiration	acid/alk.	—	alkaline	alkaline	alkaline	alkaline	alkaline
change	3	3	4-5	4	5	5	5
staining	—	—	3	4	3-4	5	5
Pleating	conditions	—	—	intermediate	intermediate	intermediate	inter.
(steam)	change	—	—	5	5	5	5
staining	—	—	—	2	2-3	2-3	2-3
Washing	conditions	II	ISO 2	ISO 2	ISO 3	ISO 3	ISO 3
change	5	5	3	3-4	4	5	4-5
staining	—	—	3	3	3	5	5
OTHER USES							
Textile							
Non-Textile			Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics				
NOTES	*For details of Tests see Colour Index, 2nd Edition, 1956		*Gives 'Bordeaux' hues when diazotised and developed with B.O.N.A. (C.I. Developer 8)				

Monoazo

ACETATE

NYLON

—
TRIACETATE

POLYESTER

ACRYLIC

Reddish Orange
redder, brighter

Dull Red
little yellower

Reddish Orange
redder

Reddish Orange
redder

Reddish Orange
little change

CHEMICAL CLASS

C.I. CONSTITUTION NO.

SUBSTRATE

HUE

Artificial Light (tungsten)

N

N, DD*

N

Nc, HT

N

DYEING

Methods

Dyeing Properties

Rate

Temp. range

Levelling

Build-up

Reservation cotton
viscose
wool

PRINTING

Fixation

Dischargeability

—

—

—

—

4

4

2

AS†

√

AS†

√

—

√

—

—

—

—

ISO

—

—

—

daylight

4-5

5-6

6

2

alkaline

4

3-4

—

—

—

ISO 2

3-4

2-3

ISO

severe

4-5

2-3

daylight

—

4

—

—

alkaline

4-5

3

—

—

—

ISO 2

4

2-3

ISO

mild

4-5

4-5

daylight

—

5-6

—

4-5

alkaline

4-5

3

—

—

—

ISO 2

3-4

2-3

ISO

intermediate

3-4

2-3

daylight

—

5

—

—

alkaline

4-5

5

—

—

—

ISO 3

4-5

5

ISO

intermediate

3

3-4

daylight

5-6

6

—

—

alkaline

4-5

5

—

—

—

ISO 3

4-5

5

FASTNESS

Test Methods

Dry Heat conditions
change
staining

Light source
pale
medium
heavy

Nitrogen Oxides

Perspiration acid/alk.
change
staining

Pleating conditions
(steam) change
staining

Washing conditions
change
staining

Main usage is on Acetate and Acrylic fibres

OTHER USES

Textile

Non-Textile

NOTES

*Gives 'Bordeaux' hues when diazotised and developed with B.O.N.A. (C.I. Developer 8): Light fastness, 2; perspiration, 4, 4-5

†Shows tendency to sublime on steaming

C.I. Disperse Orange 9—11

C.I. Disperse Orange	9	10			
CHEMICAL CLASS	Monoazo	Monoazo			
C.I. CONSTITUTION NO.	—	13056			
SUBSTRATE	ACETATE	ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE	Reddish Orange	Bright Orange	Bright Orange	Bright Orange	Bright Reddish Orange
Artificial Light (tungsten)	little change	little brighter	little brighter	little brighter	little brighter
DYEING					
Methods	N	printing only*	printing only*	printing only*	printing only*
Dyeing Properties					
Rate	rapid	—	—	—	—
Temp. range	moderate	—	—	—	—
Levelling	—	—	—	—	—
Build-up	good	—	—	—	—
Reservation					
cotton	4	—	—	—	—
viscose	4	—	—	—	—
wool	1-2	—	—	—	—
PRINTING					
Fixation	AS	AS	AS	PS, (ASc)	PS, AS
Dischargeability	✓	✓	✓	—	—
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	ISO
Dry Heat					
conditions	—	mild	intermediate	intermediate	mild
change	—	5	5	5	5
staining	—	5	4-5	4-5	5
Light					
source	daylight	daylight	daylight	daylight	daylight
pale	4	4-5	3-4	4	4
medium	4-5	5	4-5	4-5	4-5
heavy	5	—	—	—	—
Nitrogen Oxides	3-4	5	5	5	5
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	4-5	5	5	5	5
staining	4	3	3-4	4	5
Pleating					
(steam)					
conditions	—	mild	intermediate	intermediate	intermediate
change	—	5	5	5	5
staining	—	5	4	5	5
Washing					
conditions	—	ISO 2	ISO 2	ISO 3	ISO 2
change	—	4	3-4	5	5
staining	—	3	3	3-4	5
OTHER USES					
Textile	Nylon: Hue—Red (AATCC), Light fastness, 5	Polyester: not recommended—poor yield, low light fastness			
Non-Textile		Wool Sheepskins and Furs Plastics			
NOTES		*On the above substrates this dye is phototropic. Hence it is not recommended for dyeing, but is acceptable for printing			

Anthraquinone

60700

CHEMICAL CLASS

C.I. CONSTITUTION NO.

SUBSTRATE

HUE

Artificial Light (tungsten)

ACETATE

Bright Orange
redder

NYLON

Bright Yellowish
Red
yellower

TRIACETATE

Bright Yellowish
Orange
little change

POLYESTER

Bright Orange
redder

ACRYLIC

Reddish Orange
redder, brighter

N

N

N

Nc, HT

N

DYEING

Methods

C—moderate
C—good
B—very good
C—goodrapid
good
very good
moderateC—moderate
C—good
D—moderate
C—goodmoderate
good
good
moderatemoderate
moderate
good
moderate

Dyeing Properties

Rate
Temp. range
Levelling
Build-up3-4
4-5
34
4-5
34
4-5
2-3—
5
3—
5
2Reservation cotton
viscose
woolAS
xAS
x—
x—
x—
x

PRINTING

Fixation
Dischargeability

ISO

—
—
—ISO
intermediate
5
2ISO
intermediate
5
2-3ISO
intermediate
5
1-2ISO
mild
3-4
3FASTNESS
Test MethodsDry Heat conditions
change
stainingdaylight
5
4
4daylight
4
4
4daylight
3-4
3-4
3-4daylight
4-5
5
5daylight
5-6
5-6
—Light source
pale
medium
heavy

5

5

5

5

5

Nitrogen Oxides

alkaline
4
3alkaline
5
3alkaline
5
3-4alkaline
5
5alkaline
5
4-5Perspiration acid/alk.
change
staining—
—
—intermediate
5
2intermediate
5
2-3intermediate
5
2intermediate
4
2-3Pleating (steam) conditions
change
stainingISO 2
4
3ISO 2
4
3-4ISO 3
4-5
4ISO 3
5
5ISO 3
4-5
5Washing conditions
change
stainingWool Sheepskins and Furs
Surface dyeing of thermoplastics

OTHER USES

Textile

Non-Textile

Of use mainly in pale depths because of poor fastness to sublimation
Literature: *Vickerstaff*, 273, 368, 371, 373
Bird, *JSDC*, 70 (1954), 74, 76

NOTES

C.I. Disperse Orange 12—16

C.I. Disperse Orange		12	13				
CHEMICAL CLASS		Azo	Disazo				
C.I. CONSTITUTION NO.		—	26080				
SUBSTRATE		ACETATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Yellowish Orange	Orange	Reddish Orange	Reddish Orange	Reddish Orange	Orange
Artificial Light (tungsten)		redder	redder	redder	little redder	little redder	redder
DYEING Methods		N	N	N	Nc, (N)	HT, T, (Nc)	N
Dyeing Properties							
Rate		rapid	D—slow	slow	D—slow	moderate	slow
Temp. range		moderate	E—poor	poor	E—poor	moderate	poor
Levelling		good	D—moderate	moderate	D—moderate	poor	moderate
Build-up		good	C—good	good	C—good	good	poor
Reservation							
cotton		4-5	3-4	5	3	3-4	—
viscose		4-5	4-5	4-5	3-4	4	4
wool		3-4	2-3	2-3	2-3	2	2-3
PRINTING							
Fixation		AS	AS	AS	PS, (AS)	PS, (ASc)	PS
Dischargeability		✓	✓	✓	✓	—	—
FASTNESS							
Test Methods		ISO	ISO AATCC	ISO AATCC	ISO	ISO AATCC	ISO
Dry Heat		conditions	mild	inter.	intermediate	inter. III	inter.
change		—	5	5	5	5	—
staining		—	4-5	4	4-5	4 3-4	3-4
Light		source	day.	C. arc	daylight	day.	C. arc
pale		3	5	5	4-5	6	5-6
medium		4	5-6	6-7	5	6-7	6-7
heavy		4-5	6-7	—	6	7 7	—
Nitrogen Oxides		3-4	4-5 4-5	5 5	5	5 —	—
Perspiration		acid/alk.	alk. alk.	alk. alk.	alkaline	alk. alk.	alk.
change		—	4-5 4-5	5 5	5	5 5	5
staining		—	4-5 4-5	4-5 —	5	5 5	5
Pleating		conditions	mild	inter.	intermediate	severe	inter.
(steam)		change	5	4-5	5	5	5
staining		—	4-5	4-5	4-5	4-5	4
Washing		conditions	ISO 2 I	ISO 2 II	ISO 3	ISO 4 II	ISO 3
change		—	4-5 5	5 4	4-5	5 5	4-5
staining		—	4-5 4-5	4 4-5	4-5	5 5	4-5
OTHER USES							
Textile		Nylon (ISO): light fastness, 5-6	PVC fibres				
Non-Textile			Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics				
NOTES			Literature: <i>Vickerstaff</i> , 273, 368, 371, 375 Bird, <i>JSDC</i> , 70 (1954), 76				

14	15	16		C.I. Disperse Orange
Monoazo — ACETATE Reddish Orange redder, brighter	Nitro 10350 ACETATE Bright Yellowish Orange little redder	— — ACETATE Reddish Orange little change	— — ACETATE* Bordeaux —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N — moderate good — 4 4 2 AS ✓	N moderate very good very good good 4 4 2 AS* ×	N rapid good very good very good 4 4 2 AS —	DD — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 3-4 4-5 5-6 4 alkaline 4 2 — — ISO 1 4 3	B† A† — — — — — — day. day. 6-7 — 7 6 7-8 — — 3 — — 4 5 4 — — — — — — — — II 3 5 3 —	A† — — — daylight 6 — 1 — 3 — — — — II 3 —	A† — — — daylight 5 — 4 — 5 — — — — II 5 —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon	Nylon: (A†), light,5; wash II, 5	Nylon: Hue—Red; fastness A†, light,5; perspiration, 3; washing II, 5		OTHER USES Textile Non-Textile
	*Tends to volatilise †For details of Tests see Colour Index, 2nd Edition, 1956	*Diazotised and developed with B.O.N.A. (C.I. Developer 8) †For details of Tests see Colour Index, 2nd Edition, 1956		NOTES

C.I. Disperse Orange 17—20

C.I. Disperse Orange	17	18	19		
CHEMICAL CLASS	Monoazo	Azo	—		
C.I. CONSTITUTION NO.	—	—	—		
SUBSTRATE	ACETATE	ACETATE	ACETATE	TRIACETATE	POLYESTER
HUE	Bright Reddish-Orange little duller	Dull Reddish-Orange redder, brighter	Dull Reddish-Orange brighter	Dull Reddish-Orange brighter	Dull Reddish-Orange brighter
Artificial Light (tungsten)					
DYEING					
Methods	N	N	N	N	Nc, HT
Dyeing Properties					
Rate	rapid	—	—	—	—
Temp. range	good	excellent	—	—	—
Levelling	good	very good	good	good	—
Build-up	good	—	—	—	—
Reservation					
cotton	3-4	4	5	—	—
viscose	3-4	4	5	—	—
wool	2	2	3-4	—	—
PRINTING					
Fixation	AS	AS	AS	PS, AS	—
Dischargeability	✓	✓	✓	✓	—
FASTNESS					
Test Methods	A*	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	—	—	intermediate
change	—	—	—	—	4-5
staining	—	—	—	—	4
Light	source	daylight	daylight	daylight	daylight
pale	—	4-5	5	4-5	5
medium	4-5	5-6	5-6	5	5-6
heavy	—	6-7	6	5-6	6
Nitrogen Oxides	4-5	3-4	—	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
change	—	4	4-5	5	5
staining	4-5	3	3-4	5	5
Pleating	conditions	—	—	—	severe
(steam)	change	—	—	—	5
staining	—	—	—	—	5
Washing	conditions	ISO 1	ISO 1	ISO 4	ISO 3
change	3	4	5	4-5	5
staining	—	3	4-5	4-5	5
OTHER USES					
Textile	Nylon: (A*), light, 4-5; perspiration, 4-5	Nylon			
Non-Textile					
NOTES	*For details of Tests see Colour Index, 2nd Edition, 1956				

Azo

ACETATE

NYLON

TRIACETATE

POLYESTER

Yellowish Orange
little redder

Yellowish Orange
little redder

Yellowish Orange
little redder

Yellowish Orange
little redder

CHEMICAL CLASS

C.I. CONSTITUTION NO.

SUBSTRATE

HUE

Artificial Light (tungsten)

N

N

N, HT

Nc, HT

DYEING

Methods

Dyeing Properties

Rate

Temp. range

Levelling

Build-up

Reservation cotton
viscose
wool

PRINTING

Fixation

Dischargeability

—

—

—

—

—

—

—

—

—

—

—

—

3-4

—

—

—

2

—

—

—

AS

AS

PS, (AS)

PS

✓

✓

✓

—

ISO

AATCC

ISO

ISO

AATCC

ISO

AATCC

FASTNESS

Test Methods

Dry Heat conditions
change
staining

—

—

severe

inter.

—

inter.

—

—

—

4-5

5

—

4-5

—

—

—

3

4-5

—

4

—

day.

C.arc

daylight

day.

C.arc

day.

C.arc

Light

source
pale
medium
heavy

4-5

5-6

—

2

4

5-6

6

6

6-7

6-7

4

5-6

6-7

6-7

7

7

—

6-7

6-7

7-8

7-8

5

5

5

5

5

5

5

Nitrogen Oxides

alk.

—

alkaline

alk.

—

alk.

—

Perspiration acid/alk.
change
staining

5

—

4-5

5

—

5

—

4

—

4-5

4-5

—

5

—

—

—

intermediate

—

inter.

inter.

—

Pleating conditions
(steam) change
staining

—

—

4-5

—

5

5

—

—

—

4

—

4-5

4-5

—

ISO 3

III

ISO 2

ISO 3

III

ISO 4

III

Washing

conditions
change
staining

4-5

3-4

4-5

5

5

5

5

4-5

3

3-4

5

4-5

4-5

5

Acrylic: (ISO), light, 5; washing (2), 4-5, 5

OTHER USES

Textile

Non-Textile

NOTES

C.I. Disperse Orange 21—25

C.I. Disperse Orange		21					22	
CHEMICAL CLASS		Azo					Disazo	
C.I. CONSTITUTION NO.		—					—	
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER		
HUE		Orange	Orange	Orange	Orange	Bright Yellowish Orange		
Artificial Light (tungsten)		brighter	brighter	brighter	brighter	—		
DYEING Methods		N	N	N, HT	Nc, HT	HT*		
Dyeing Properties								
Rate		—	—	—	—	—		
Temp. range		—	—	—	—	—		
Levelling		—	—	—	—	—		
Build-up		—	—	—	—	—		
Reservation		3	—	—	—	—		
cotton		—	—	—	—	—		
viscose		1-2	—	—	—	—		
wool								
PRINTING		AS	AS	PS (AS)	PS	—		
Fixation		√	√	×	×	—		
Dischargeability								
FASTNESS		ISO AATCC		ISO AATCC		ISO		
Test Methods								
Dry Heat		conditions		inter.		inter.		
change		—		—		—		
staining		—		—		—		
Light		source		day.		daylight		
pale		5-6		2		5		
medium		6		4		6		
heavy		6-7		5-6		7		
Nitrogen Oxides		5		5		5		
Perspiration		alk.		alk.		alk.		
acid/alk.		5		5		5		
change		3		4		4-5		
staining		—		—		—		
Pleating		—		inter.		inter.		
(steam)		—		5		5		
change		—		4-5		4-5		
staining		—		—		—		
Washing		ISO 3		ISO 3		ISO 4		
conditions		4-5		4-5		4-5		
change		III		III		III		
staining		3-4		4-5		5		
		2-3		4-5		5		
OTHER USES		Acrylic (limited use): (ISO), light, 5-6; wash (2), 4-5, 5						
Textile								
Non-Textile								
NOTES							Literature: FP 1187253 *Best yield obtained by application at 140°C and pH 4-5.5	

23		24	25			C.I. Disperse Orange	
— —		— —	Monoazo —			CHEMICAL CLASS	
ACETATE*	NYLON*	POLYESTER	ACETATE	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.	
Reddish Orange redder, brighter	Reddish Orange —	Bright Orange little redder	Bright Reddish Orange little redder	Bright Reddish Orange little redder	Bright Orange redder	SUBSTRATE	
						HUE	Artificial Light (tungsten)
N	N (90–95°C)	Nc, HT	N	N	Nc, HT	DYEING Methods	
—	—	—	—	—	Nc HT	Dyeing Properties	
—	—	—	—	—	— —	Rate	
—	—	—	—	—	— —	Temp. range	
—	—	—	—	—	— good	Levelling	
—	—	—	—	—	good v. good	Build-up	
4	4	4–5	4	—	4	Reservation	cotton
—	—	3–4	3	—	4		viscose
—	—	—	—	—	3		wool
—	—	PS	AS	PS	PS	PRINTING	
—	—	x	✓	✓	—	Fixation	
						Dischargeability	
AATCC	AATCC	ISO AATCC	AATCC	ISO	ISO AATCC	FASTNESS	
—	I	inter. —	—	intermediate	mild II	Test Methods	
—	4–5	4–5 —	—	5	5 4–5	Dry Heat	conditions
—	5	3 —	—	4	4–5 4		change
Carbon arc	Carbon arc	day. C. arc	Carbon arc	daylight	day. C. arc	Light	source
5–6	6–7	6 6	4	4	4–5 5–6		pale
6	7	7–8 6–7	6	5	5–6 6		medium
—	—	8 7	—	6	6 6–7		heavy
—	—	— —	4–5	4–5	— 5	Nitrogen Oxides	
alkaline	alkaline	alk. —	alkaline	alkaline	alk. alk.	Perspiration	acid/alk.
5	5	4–5 —	5	5	5 5		change
5	5	4–5 —	5	4–5	4–5 5		staining
—	—	inter. —	—	severe	inter. —	Pleating	conditions
—	—	5 —	—	5	5 —	(steam)	change
—	—	4 —	—	4	4–5 —		staining
III	III	ISO4 III	II	ISO2	ISO4 III	Washing	conditions
4	5	4–5 5	5	4–5	5 4–5		change
3–4	4–5	4 5	4–5	4	4–5 5		staining
			Nylon (Reddish Orange): (AATCC) light, 4–5; washing (IIA), 3, 1–2			OTHER USES	
						Textile	
						Non-Textile	
*Pale depths only						NOTES	

C.I. Disperse Orange 26—30

C.I. Disperse Orange	26	27		28
CHEMICAL CLASS	Disazo	Disazo		Azo
C.I. CONSTITUTION NO.	—	—		—
SUBSTRATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER
HUE	Bright Orange	Bright Yellowish Orange	Bright Yellowish Orange	Reddish Orange
Artificial Light (tungsten)	yellower, brighter	little redder	little redder	—
DYEING				
Methods	Nc, HT	N	N	Nc, HT, T
Dyeing Properties				
Rate	—	—	moderate	—
Temp. range	—	—	moderate	—
Levelling	—	—	—	—
Build-up	—	—	good	—
Reservation				
cotton	—	—	4	—
viscose	—	—	4	—
wool	—	—	1-2	4
PRINTING				
Fixation	PS	—	—	PS
Dischargeability	—	—	—	—
FASTNESS				
Test Methods	AATCC	AATCC	AATCC	AATCC
Dry Heat	conditions	—	—	—
change	—	—	—	—
staining	—	—	—	—
Light	Carbon arc	Carbon arc	Carbon arc	Carbon arc
source	—	5	5	—
pale	—	5-6	5-6	6
medium	5-6	6	6	—
heavy	—	—	—	—
Nitrogen Oxides	4-5	4	4	—
Perspiration	acid/alk.	alkaline	alkaline	—
change	4-5	5	5	—
staining	4-5	—	—	—
Pleating	conditions	—	—	—
(steam)	change	—	—	—
staining	—	—	—	—
Washing	conditions	II	III	III
change	4-5	4-5	4-5	5
staining	—	4-5	4-5	—
OTHER USES				
Textile	Nylon (ISO): Light, 5-6; Wash (3), 3, 2	Nylon (AATCC): light, 4, 5, 5-6		
Non-Textile	Acetate, Triacetate			
NOTES				

29	30						C.I. Disperse Orange
Azo — POLYESTER Orange —	Monoazo — ACETATE Orange redder TRIACETATE Orange redder POLYESTER Dull Orange little redder						CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — — — — — 3-4 PS —	N — — — — 5 5 3	N — — — — 5 5 3	Nc, HT, T — — — — — — — PS, (ASc) —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability			
AATCC — — — Carbon arc — 6-7 — — — alkaline 5 5 — — — IV 5 —	ISO — — — day. 6-7 7 7-8 5 alk. 5 4-5 — — — ISO 3 4-5 4-5	AATCC — — — C. arc 6 7 7-8 5 — — — III 4-5 3	ISO inter. 5 5 day. 4-5 5-6 6-7 5 alk. 5 4-5 inter. 5 4-5 ISO 3 5 5	AATCC III 5 5 C. arc 5 6 6 5 — — — III 5 4-5	ISO — — — day. 6-7 7 7 5 alk. 5 5 severe 5 4 ISO 3 5 5	AATCC III — 4-5 7 7 — 5 — — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
							OTHER USES Textile Non-Textile
							NOTES

C.I. Disperse Orange 31—34

C.I. Disperse Orange		31				
CHEMICAL CLASS		Monoazo				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Reddish Orange	Yellowish Red	Reddish Orange	Reddish Orange	Yellowish Red
Artificial Light (tungsten)		little redder	brighter	little redder	little redder	brighter
DYEING						
Methods		N	N	Nc, HT	Nc, HT	N
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		excellent	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	—	—	—
	viscose	—	—	—	—	—
	wool	—	—	—	—	—
PRINTING						
Fixation		AS	AS	PS, (AS)	PS, (ASc)	PS
Dischargeability		✓	✓	✓	—	—
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	intermediate	intermediate	severe	mild
	change	4-5	4	4-5	4-5	5
	staining	4-5	3	4-5	2-3	4-5
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	5-6	4	4	5	4-5
	medium	6	4-5	4-5	5-6	5
	heavy	6	4-5	5	6	—
Nitrogen Oxides		4-5	—	4-5	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	3-4	4-5	5	5
	staining	4	4-5	4	5	4-5
Pleating (steam)	conditions	mild	intermediate	intermediate	severe	intermediate
	change	4-5	4	5	5	5
	staining	4-5	4	4-5	3-4	4
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 4	ISO 3
	change	4-5	4	4	4-5	5
	staining	4	2	4	5	5
OTHER USES						
Textile						
Non-Textile						
NOTES						

32		33	34	C.I. Disperse Orange
Aminoketone		—	Azo	CHEMICAL CLASS
—		—	—	C.I. CONSTITUTION NO.
TRIACETATE	POLYESTER	POLYESTER	POLYESTER	SUBSTRATE
Bright Yellowish Orange	Bright Yellowish Orange	Reddish Orange	Orange	HUE
—	—	brighter	—	Artificial Light (tungsten)
T, (Nc, HT*)	(Nc), HT, T	Nc, HT	Nc, HT	DYEING
Method Nc	HT			Methods
D—slow	—	—	—	Dyeing Properties
E—poor	—	—	—	Rate
C—good	poor	—	—	Temp. range
E—poor	moderate	—	—	Levelling
				Build-up
3-4	3-4	—	4	Reservation
5	4	—	4	cotton
3	3	—	1-2	viscose
—				wool
x	PS, T	—	—	PRINTING
	x	—	—	Fixation
				Dischargeability
ISO	ISO	ISO	ISO	FASTNESS
severe	severe	intermediate	intermediate	Test Methods
5	4-5	4-5	5	Dry Heat
4-5	4-5	3-4	5	conditions
				change
				staining
daylight	daylight	daylight	daylight	Light
6	6-7	5-6	6	source
5-6	7	5-6	7	pale
5	7	5-6	7	medium
				heavy
5	5	—	—	Nitrogen Oxides
alkaline	alkaline	alkaline	alkaline	Perspiration
5	5	5	5	acid/alk.
5	5	5	5	change
				staining
severe	severe	severe	—	Pleating
4-5	5	4-5	—	(steam)
5	5	4-5	—	conditions
				change
ISO 3	ISO 4	ISO 4	ISO 3	staining
5	4-5	4-5	5	Washing
5	5	4-5	5	conditions
				change
				staining
				OTHER USES
				Textile
				Non-Textile
*Pale depths only				NOTES

C.I. Disperse Orange 35—37

C.I. Disperse Orange		35			
CHEMICAL CLASS		Azo			
C.I. CONSTITUTION NO.					
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER
HUE		Reddish Orange	Red	Reddish Orange	Reddish Orange
Artificial Light (tungsten)		—	—	—	—
DYEING					
Methods		N	N*	N	Nc, HT
Dyeing Properties					
Rate		—	—	—	—
Temp. range		—	—	—	—
Levelling		—	—	—	—
Build-up		—	—	—	—
Reservation	cotton	4	—	—	4
	viscose	4	—	—	4
	wool	1	—	—	1
PRINTING					
Fixation		—	—	—	—
Dischargeability		—	—	—	—
FASTNESS					
Test Methods		ISO	ISO	ISO	ISO
Dry Heat	conditions	—	intermediate	severe	severe
	change	—	4-5	5	4-5
	staining	—	5	4-5	4
Light	source	daylight	daylight	daylight	daylight
	pale	5-6	2-3	4	4-5
	medium	5-6	3	4-5	5
	heavy	6	3-4	5	5
Nitrogen Oxides		—	—	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
	change	4	5	5	5
	staining	5	5	5	5
Pleating	conditions	—	intermediate	severe	severe
(steam)	change	—	5	4	5
	staining	—	5	4-5	5
Washing	conditions	ISO 1	ISO 1	ISO 4	ISO 4
	change	3-4	5	4	5
	staining	5	5	5	5
OTHER USES					
Textile					
Non-Textile					
NOTES		*Nylon: light fastness poor in pale depths			

36	37			C.I. Disperse Orange
— — POLYESTER Reddish Orange little change	Monoazo — ACETATE Dull Reddish Orange redder TRIACETATE Dull Reddish Orange redder POLYESTER Dull Orange redder			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT — — — — 5 5 3-4 — —	N — — — moderate — — — AS ✓	Nc, HT, T — — — good — — — PS, (AS) ✓	Nc, HT, T — — — very good — — — PS —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC II 5 — Carbon arc 4 5 — — — — — — — — III 5 5	AATCC — — — Carbon arc — 6 — 5 alkaline 5 — — — — II 4-5 4-5	AATCC V — 3-4 Carbon arc 5 5-6 — 5 alkaline 5 — — — — III 5 5	AATCC V — 3-4 Carbon arc 5-6 6-7 — 5 alkaline 5 — — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Acetate, Triacetate, (Nylon)				OTHER USES Textile Non-Textile
				NOTES

C.I. Disperse Orange 38—41

C.I. Disperse Orange		38			
CHEMICAL CLASS		Disazo			
C.I. CONSTITUTION NO.					
SUBSTRATE		ACETATE	NYLON*	TRIACETATE	POLYESTER
HUE		Orange	Orange	Orange	Orange
Artificial Light (tungsten)		little redder	little redder	little redder	little redder
DYEING					
Methods		N	N	N, HT	Nc, HT, T
Dyeing Properties					
Rate		—	—	—	—
Temp. range		—	—	—	—
Levelling		—	—	—	—
Build-up		—	—	—	—
Reservation	cotton	—	—	—	4
	viscose	—	—	—	—
	wool	—	—	—	3
PRINTING					
Fixation		—	—	—	—
Dischargeability		✓	✓	—	—
FASTNESS					
Test Methods		ISO	ISO	ISO	ISO
Dry Heat	conditions	—	intermediate	intermediate	intermediate
	change	—	5	4-5	4-5
	staining	—	4-5	4	4-5
Light	source	day.	daylight	daylight	day.
	pale	4-5	—	5	6-7
	medium	5	6	5-6	5-6
	heavy	5-6	—	6	6-7
Nitrogen Oxides		4-5	—	4-5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
	change	4-5	4-5	4-5	4-5
	staining	5	4	4-5	4-5
Pleating	conditions	—	intermediate	—	severe
(steam)	change	—	5	—	4-5
	staining	—	5	—	5
Washing	conditions	ISO 1	ISO 2	ISO 3	ISO 3
	change	4	5	4	4-5
	staining	4-5	5	5	5
OTHER USES					
Textile		Acrylic (of limited interest only): ISO tests—light, 4-5; dry heat (inter.), 5, 5; washing (3), 5, 4-5			
Non-Textile					
NOTES		*Of limited interest on Nylon			

39		40	41		C.I. Disperse Orange
Disazo		Monoazo	Monoazo		CHEMICAL CLASS
TRIACETATE	POLYESTER	POLYESTER	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Orange	Orange	Bright Yellowish	Dull Orange	Dull Orange	SUBSTRATE
redder	redder	Orange	redder, brighter	redder, brighter	HUE
		redder			Artificial Light (tungsten)
Nc	Nc, HT (pH 4.5-5)	Nc, HT*, T	Nc, HT	Nc, HT, T	DYEING Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
—	—	—	—	—	Levelling
—	4	—	—	—	Build-up
—	4	—	—	—	Reservation
—	2	—	—	—	cotton
					viscose
					wool
—	PS, T	PS, T	PS	PS, T	PRINTING
—	—	—	—	—	Fixation
					Dischargeability
ISO	ISO	AATCC	AATCC	AATCC	FASTNESS
—	intermediate	II	—	III	Test Methods
—	4-5	5	—	4-5	Dry Heat
—	3-4	5	—	5	conditions
daylight	daylight	daylight	Carbon arc	Carbon arc	change
—	6	4	5-6	4-5	staining
7	6-7	6	—	5-6	Light
—	7	—	—	5-6	source
—	—	4-5	—	5	pale
alkaline	alkaline	alkaline	—	alkaline	medium
5	5	4-5	—	4-5	heavy
5	4-5	5	—	5	Nitrogen Oxides
—	—	severe	—	severe	Perspiration
—	—	4-5	—	4-5	acid/alk.
—	—	4	—	4-5	change
ISO 3	ISO 4	III	IIA	III	staining
5	5	4-5	4-5	5	Pleating
5	4	4-5	4-5	4-5	(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
		Acetate: (AATCC) light, 3-4	Acetate: (AATCC) light, 6-7; wash- ing IIA, 4-5, 3 Acrylic, Modacrylic		Textile
					Non-Textile
					NOTES
		*Sensitive to met- als in dyebath; apply with ad- dition of seques- tering agent			

C.I. Disperse Orange 42—47

C.I. Disperse Orange	42		43	44
CHEMICAL CLASS	Monoazo		Azo	Monoazo
C.I. CONSTITUTION NO.	—		—	—
SUBSTRATE	TRIACETATE	POLYESTER	POLYESTER	POLYESTER
HUE	Bright Reddish Orange brighter	Bright Yellowish Red little yellower	Reddish Orange —	Reddish Orange redder
Artificial Light (tungsten)				
DYEING				
Methods	T	HT, (Nc) T (210°C)	HT, T	T
Dyeing Properties				
Rate	—	—	moderate	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	—	—	good	—
Reservation				
cotton	—	—	4	—
viscose	—	—	4	—
wool	—	—	1-2	—
PRINTING				
Fixation	—	—	PS	—
Dischargeability	—	—	—	—
FASTNESS				
Test Methods	ISO	ISO	AATCC	AATCC
Dry Heat	intermediate	intermediate	—	—
conditions	5	5	—	—
change	5	4-5	—	—
staining				
Light	daylight	daylight	Carbon arc	Carbon arc
source	3	5	5	4-5
pale	3	5	6	5-6
medium	4	5-6	6	6
heavy				
Nitrogen Oxides	4-5	5	5	5
Perspiration	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	5	4-5
change	5	5	5	5
staining				
Pleating	severe	severe	—	—
(steam)	5	5	—	—
change	5	5	—	—
staining				
Washing	ISO 3	ISO 4	III	III
conditions	5	4-5	5	4-5
change	5	4-5	5	5
staining				
OTHER USES				
Textile	Acetate: Unsuitable; poor affinity Nylon: Not recommended			
Non-Textile				
NOTES				

45			46	47	C.I. Disperse Orange
Monoazo				Polymethine	CHEMICAL CLASS
ACETATE	TRIACETATE	POLYESTER		—	C.I. CONSTITUTION NO.
Reddish Orange	Reddish Orange	Reddish Orange		NYLON	SUBSTRATE
redder	redder	redder, brighter		Bright Reddish Orange redder	HUE
					Artificial Light (tungsten)
N	N, HT	Nc, HT, T		N (95–98°C)	DYEING
—	—	—		—	Methods
moderate	—	—		—	Dyeing Properties
—	—	—		—	Rate
—	—	—		—	Temp. range
—	—	—		—	Levelling
—	—	4–5		—	Build-up
—	—	—		—	Reservation
—	—	3–4		—	cotton
AS	PS	—		AS	viscose
✓	—	—		×	wool
			This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Brown 1		PRINTING
					Fixation
					Dischargeability
ISO	ISO	ISO		ISO	FASTNESS
—	intermediate	intermediate		—	Test Methods
—	4–5	4–5		—	Dry Heat
—	4	4–5		—	conditions
day. 5	day. 5	daylight 6–7		daylight 6	change
5–6	Xe.arc 5–6	6–7		6–7	staining
6	6–7	—		6–7	
4–5	4–5	—		—	Light
alkaline 4	alkaline 4–5	alkaline 4–5		alkaline 4–5	source
4–5	4–5	4–5		5	pale
—	—	—		—	medium
—	—	—		—	heavy
—	—	—		—	Nitrogen Oxides
ISO 2	ISO 3	ISO 3		ISO 3	Perspiration
4–5	4	4–5		4	acid/alk.
4–5	5	5		3–4	change
					staining
					Pleating
					(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
Nylon and Acrylic: Not recommended					OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Orange 48—53

C.I. Disperse Orange	48	49	50	51
CHEMICAL CLASS	Monoazo	Azo	Azo	Azo
C.I. CONSTITUTION NO.	—	—	—	—
SUBSTRATE	NYLON	POLYESTER	POLYESTER	POLYESTER
HUE	Bright Yellowish Red	Bright Reddish Orange	Yellowish Orange	Orange
Artificial Light (tungsten)	brighter	little change	redder	little redder
DYEING				
Methods	N (95–98°C)	HT, T, (Nc)	HT, (Nc)	HT, (Nc)
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	moderate	—	—
Build-up	—	moderate	—	—
Reservation				
cotton	—	—	—	—
viscose	—	—	4	4
wool	—	—	—	—
PRINTING				
Fixation	AS	PS	—	—
Dischargeability	—	√	—	—
FASTNESS				
Test Methods	ISO	AATCC	AATCC	AATCC
Dry Heat	conditions	III	III	III
change	—	—	—	—
staining	—	4–5	4	4
Light	source	Carbon arc	Carbon arc	Carbon arc
pale	daylight	—	4–5	4–5
medium	6	5–6	5	5–6
heavy	6	—	—	—
Nitrogen Oxides	—	—	—	—
Perspiration	acid/alk.	—	alkaline	alkaline
change	4–5	—	5	5
staining	4	—	5	5
Pleating	conditions	—	—	—
(steam)	change	—	—	—
staining	—	—	—	—
Washing	conditions	II	II	II
change	ISO 3	5	5	5
staining	4	5	5	5
	2–3			
OTHER USES				
Textile				
Non-Textile				
NOTES		Sensitive to temperature variations on thermofixation		

52				53	C.I. Disperse Orange
Monoazo				Monoazo —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Bright Reddish Orange yellower	TRIACETATE Bright Reddish Orange yellower	POLYESTER Bright Reddish Orange yellower	ACRYLIC Reddish Orange yellower	POLYESTER Orange little brighter	
N	N, Nc	Nc, HT	N	Nc, HT T (200–210°C)	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool
C—moderate D—moderate C—good B—very good — — —	— — — — — — —	— — — — — — —	— — — — — — —	— — good (HT) — 4 — 2–3	PRINTING Fixation Dischargeability
AS —	PS, (AS) —	PS —	PS —	PS ×	
ISO mild 5 5	ISO intermediate 5 5	ISO severe 4 3–4	ISO mild 5 5	ISO intermediate 5 4–5	FASTNESS Test Methods Dry Heat conditions change staining
daylight 5–6 6 7	daylight 4 5 5	daylight 4–5 5 5	daylight 7 7 —	daylight 5–6 6 6–7	Light source pale medium heavy
5	5	5	5	5	Nitrogen Oxides
alkaline 4–5 4	alkaline 4–5 4–5	alkaline 5 5	alkaline 5 5	alkaline 5 5	Perspiration acid/alk. change staining
mild 5 5	intermediate 5 5	severe 5 4	intermediate 4–5 5	severe 5 5	Pleating (steam) conditions change staining
ISO 1 4–5 4–5	ISO 2 5 5	ISO 2 5 5	ISO 2 5 5	ISO 4 5 4–5	Washing conditions change staining
Nylon: Poor affinity				Recommended only for polyester	OTHER USES Textile Non-Textile
				May give catalytic fading with some an- thraquinone blue dyes	NOTES

C.I. Disperse Orange 54—58

C.I. Disperse Orange	54			55		
CHEMICAL CLASS	Disazo			Azo		
C.I. CONSTITUTION NO.	—			—		
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER
HUE	Yellowish Orange little redder	Yellowish Orange little redder	Yellowish Orange little redder	Yellowish Orange yellow	Yellowish Orange yellow	Yellowish Orange little redder
Artificial Light (tungsten)						
DYEING Methods	printing only	N, HT	Nc, HT, T	N	N, HT	HT, T, (Nc)
Dyeing Properties			Method HT			
Rate	—	D—slow	—	moderate	—	—
Temp. range	—	C—good	—	good	—	—
Levelling	—	D—moderate	poor	—	—	—
Build-up	—	A—excellent	very good	good	—	—
Reservation						
cotton	—	4	4	—	—	4
viscose	—	4	3-4	—	—	4
wool	—	2	2	—	—	1-2
PRINTING						
Fixation	AS	—	—	AS	PS, (AS)	PS
Dischargeability	—	—	—	✓	✓	—
FASTNESS						
Test Methods	ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat	—	intermediate	intermediate	—	severe	—
conditions	—	4-5	5	—	—	—
change	—	5	4	—	4	—
staining	—	—	—	—	—	—
Light	daylight	daylight	daylight	daylight	daylight	daylight
source	5-6	4	5-6	5-6	5-6	6
pale	6	6-7	6-7	6-7	6-7	7
medium	—	6-7	6-7	—	—	7
heavy	—	—	—	—	—	—
Nitrogen Oxides	5	4-5	—	5	5	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	4-5	5	5	4-5	4-5	5
change	4	4	5	4-5	4-5	5
staining	—	severe	intermediate	—	severe	—
conditions	—	4-5	5	—	4-5	—
change	—	4-5	5	—	5	—
staining	—	—	—	—	—	—
Washing	ISO 2	ISO 3	ISO 4	ISO 3	ISO 3	ISO 4
conditions	4-5	5	4-5	3-4	4-5	4-5
change	4-5	5	5	4	4-5	4-5
staining	—	—	—	—	—	—
OTHER USES				Nylon: Applicable by printing		
Textile						
Non-Textile						
NOTES						

56	57			58	C.I. Disperse Orange
Monoazo — POLYESTER Reddish Orange yellower	Azo — ACETATE Bright Reddish Orange brighter TRIACETATE Bright Reddish Orange brighter POLYESTER Bright Reddish Orange brighter			Azo — POLYESTER Orange brighter	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — good — 4 — 2-3 PS, T ×	N — poor — moderate — — — AS —	N, HT, T — poor — — — — — PS, (AS) —	Nc, HT, T — — — — 5 4 2 PS —	HT, T — — — — — — — PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO intermediate 5 4-5 daylight 5-6 6 6-7 5 alkaline 5 5 severe 5 5 ISO4 5 4-5	AATCC — — — Carbon arc 5 5-6 — 5 alkaline 4-5 — — — — III 4-5 3-4	AATCC V — 5 Carbon arc 4-5 5 6 5 alkaline 5 — — — — III 5 5	AATCC V — 5 Carbon arc 5 5-6 6 — alkaline 5 — — — — III 5 5	ISO severe — 4 daylight 6 6 6 — alkaline 5 5 — — — ISO4 4-5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Recommended only for polyester				Acetate and Tri- acetate: printing	OTHER USES Textile Non-Textile
May give catalytic fading with some anthraquinone blue dyes	Polyester: Good fastness to durable press finishing				NOTES

C.I. Disperse Orange 59—65

C.I. Disperse Orange	59	60		
CHEMICAL CLASS		Disazo		
C.I. CONSTITUTION NO.		—		
SUBSTRATE		NYLON	TRIACETATE	POLYESTER
HUE		Yellowish Orange redder	Yellowish Orange redder	Yellowish Orange redder
Artificial Light (tungsten)				
DYEING				
Methods		N	Nc, HT	HT, (Nc)
Dyeing Properties		(at 95°C)		(at 130°C)
Rate		very slow	E—very slow	—
Temp. range		moderate	E—poor	—
Levelling		poor	E—poor	poor
Build-up		good	A—excellent	good
Reservation	cotton	4	3-4	3-4
	viscose	4	3-4	4
	wool	3	1	2
PRINTING				
Fixation		—	—	—
Dischargeability		—	—	—
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Orange 37				
FASTNESS				
Test Methods		ISO	ISO	ISO
Dry Heat	conditions	intermediate	intermediate	severe
	change	5	4-5	5
	staining	5	5	5
Light	source	daylight	daylight	daylight
	pale	4-5	4	5
	medium	5-6	5	6
	heavy	6	5-6	6
Nitrogen Oxides		—	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline
	change	4-5	4-5	5
	staining	5	4-5	5
Pleating (steam)	conditions	severe	intermediate	intermediate
	change	4-5	4-5	5
	staining	4-5	5	5
Washing	conditions	ISO 3	ISO 3	ISO 4
	change	5	5	5
	staining	5	4-5	4-5
OTHER USES				
Textile				
Non-Textile				
NOTES				

61	62	63	64	65	C.I. Disperse Orange
Monoazo —	Monoazo —	Azo —	Azo —	Azo —	CHEMICAL CLASS
POLYESTER	POLYESTER	POLYPROPYLENE*	POLYPROPYLENE*	POLYPROPYLENE*	C.I. CONSTITUTION NO.
Dull Reddish Orange redder	Dull Orange little brighter	Yellowish Orange —	Yellowish Orange redder, brighter	Dull Yellowish Red brighter	SUBSTRATE
					HUE Artificial Light (tungsten)
HT, T — — — — — —	HT, T (Nc) — — — — — —		1 hr. at pH 5-6 and temperatures 60- 100°C rapid — — — 5 — 2-3	1 hr at pH 5-6 and temperatures 60- 100°C rapid — — — 5 — 2-3	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool
PS x	PS, T —		— —	— —	PRINTING Fixation Dischargeability
ISO intermediate 5 4 daylight 6 6-7 6-7 — alkaline 5 5 severe 4-5 4-5 ISO4 5 5	AATCC V — 4 carbon arc 5-6 6 6-7 5 alkaline 5 5 — — — IIIA 4 4-5		ISO 30sec/130°C 5 5 daylight 6 6-7 7 5 alkaline 4-5 4-5 — — — ISO3 4-5 4-5	ISO 30sec/130°C 4-5 5 daylight 5 5 5-6 5 alkaline 4 4-5 — — — ISO3 4-5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
Acetate, Nylon, Triacetate: printing	Acetate and Triacetate: printing				OTHER USES Textile Non-Textile
		*Unmodified fibre	*Nickel modified fibre	*Nickel modified fibre	NOTES

C.I. Disperse Orange 66—68

C.I. Disperse Orange		66				
CHEMICAL CLASS		Disazo				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Orange	Orange	Orange	Orange	Orange
Artificial Light (tungsten)		redder	redder	redder	redder	redder
DYEING						
Methods		N	N	N, HT	Nc, HT	N
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	5	—	—
	viscose	—	—	5	—	—
	wool	—	—	3-4	—	—
PRINTING						
Fixation		AS	AS	PS, (AS)	PS	PS
Dischargeability		—	—	—	—	—
FASTNESS						
Test Methods						
Dry Heat	conditions	ISO	ISO	ISO	ISO	ISO
	change	mild	—	intermediate	severe	mild
	staining	5	—	5	4-5	5
		5	—	4-5	3	4-5
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	—	—	—	7	—
	medium	7	6-7	7	7	5
	heavy	—	—	—	7	—
Nitrogen Oxides		4-5	—	4	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	4-5	4	5	4-5
	staining	4	4	5	5	4-5
Pleating (steam)	conditions	—	—	—	—	—
	change	—	—	—	—	—
	staining	—	—	—	—	—
Washing	conditions	ISO1	ISO3	ISO3	ISO4	ISO3
	change	4-5	4	4-5	4	2-3
	staining	4-5	2	3-4	3-4	5
OTHER USES						
Textile						
Non-Textile						
NOTES						

67		68			C.I. Disperse Orange
Monoazo		Monoazo			CHEMICAL CLASS
TRIACETATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Orange redder	Dull Orange redder	Dull Orange redder	Dull Orange redder	Dull Orange redder	SUBSTRATE
					HUE
					Artificial Light (tungsten)
Nc, HT	Nc, HT, T	N	Nc, HT	Nc, HT, T	DYEING
—	—	—	—	—	Methods
—	—	—	moderate	—	Dyeing Properties
—	—	—	good	—	Rate
—	—	—	good	—	Temp. range
—	—	—	—	4	Levelling
—	—	—	—	4	Build-up
PS, (AS) ✓	PS —	AS, T ✓	PS, T —	PS, T —	Reservation cotton viscose wool
					PRINTING
					Fixation
					Dischargeability
ISO severe 4 2-3	ISO severe 4 2	ISO — — —	ISO intermediate 4-5 4-5	ISO intermediate 5 4-5	FASTNESS
daylight 6-7 6-7 6-7	daylight 6-7 6-7 6-7	daylight 5 5-6 6	daylight 5-6 6-7 7	daylight 7 7 7	Test Methods
4	—	5	4-5	5	Dry Heat conditions change staining
alkaline 5 5	alkaline 4-5 5	alkaline 4-5 4-5	alkaline 4-5 4-5	alkaline 5 5	Light source pale medium heavy
severe 4-5 4-5	severe 4 4	— — —	— — —	— — —	Nitrogen Oxides
ISO4 3 3-4	ISO4 4 4	ISO2 4-5 5	ISO3 5 5	ISO3 5 5	Perspiration acid/alk. change staining
					Pleating conditions (steam) change staining
					Washing conditions change staining
		Nylon, Acrylic: not recommended			OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Orange 69—78

C.I. Disperse Orange	69	70	71	72	73	74
CHEMICAL CLASS	Azo	Disazo	Azo	Azo	Azo	Azo
C.I. CONSTITUTION NO.	—	—	—	—	—	—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	POLYESTER	POLYESTER	POLYESTER
HUE	Yellowish Orange redder	Bright Reddish Orange little redder	Bright Reddish Orange brighter	Bright Orange redder	Bright Orange redder	Dull Orange —
Artificial Light (tungsten)						
DYEING						
Methods	HT	HT,* T (200–210°C)	Nc, HT, T (200–210°C)	Nc, HT, T (200–210°C)	HT	HT
Dyeing Properties						
Rate	—	—	—	—	moderate	moderate
Temp. range	—	—	—	—	—	—
Levelling	—	—	—	—	—	—
Build-up	—	—	—	—	good	good
Reservation						
cotton	—	4–5	—	—	4	4
viscose	—	5	—	—	4	4
wool	—	2–3	—	—	2–3	1–2
PRINTING						
Fixation	—	PS,* T	—	—	PS	PS
Dischargeability	—	—	—	—	—	—
FASTNESS						
Test Methods						
Dry Heat	AATCC III	ISO severe	ISO severe	ISO intermediate	AATCC	AATCC
conditions	—	5	5	5	—	—
change	—	4	4–5	4–5	—	—
staining	4–5					
Light						
source	Carbon arc	daylight	Xenon arc	Xenon arc	Carbon arc	Carbon arc
pale	—	5–6	6	6	5–6	6
medium	6	6	6–7	6–7	6	6
heavy	—	6–7	7	7	6–7	6
Nitrogen Oxides	—	—	—	—	—	—
Perspiration						
acid/alk.	—	alkaline	alkaline	alkaline	—	—
change	—	5	4–5	5	—	—
staining	—	5	5	5	—	—
Pleating (steam)						
conditions	—	severe	—	—	—	—
change	—	5	—	—	—	—
staining	—	5	—	—	—	—
Washing						
conditions	III	ISO 4	ISO 4	ISO 4	III	III
change	5	4–5	5	4–5	5	5
staining	5	5	5	5	5	5
OTHER USES						
Textile			Acetate, Nylon, Triacetate: suitable	Acetate, Nylon, Triacetate: suitable	Triacetate: suitable HT dyeing, printing	Acetate and Triacetate: dyeing, printing
Non-Textile						
NOTES		*Maximum yield obtained at 140°C				

75	76			77	78	C.I. Disperse Orange
Disazo —	Monoazo —			Monoazo —	Monoazo —	CHEMICAL CLASS
POLYPROPYLENE*	ACETATE	TRIACETATE	POLYESTER	POLYESTER	POLYESTER	C.I. CONSTITUTION NO.
Yellowish Orange	Dull Orange little redder	Dull Orange little redder	Dull Reddish Orange redder	Orange	Orange	SUBSTRATE
—	—	—	—	—	—	HUE Artificial Light (tungsten)
60 min at 95–98°C	N	Nc, HT	Nc, HT, T			DYEING Methods
—	—	Method Nc	All methods			Dyeing Properties
—	—	—	—			Rate
—	—	—	—			Temp. range
—	moderate	good	very good			Levelling
—	—	—	—			Build-up
—	—	—	—			Reservation cotton viscose wool
—	AS	PS, (AS)	PS			PRINTING
—	—	—	—			Fixation Dischargeability
AATCC	ISO	ISO	ISO			FASTNESS
—	mild	intermediate	intermediate			Test Methods
—	5	5	5			Dry Heat conditions change staining
—	4–5	4–5	4			
Carbon arc	daylight	daylight	daylight			Light source pale medium heavy
6	5	5	6			
—	6	5–6	6–7			
—	6–7	6	6–7			
—	5	4–5	—			Nitrogen Oxides
—	alkaline	alkaline	alkaline			Perspiration acid/alk. change staining
—	4	4–5	5			
—	3–4	4	5			
—	mild	intermediate	severe			Pleating conditions (steam) change staining
—	5	5	4–5			
—	5	4–5	4–5			
III	ISO1	ISO3	ISO4			Washing conditions change staining
4	4–5	4–5	5			
5	4–5	3–4	5			
						OTHER USES
						Textile
						Non-Textile
*Unmodified fibre, particularly when used as backing for carpets						NOTES

C.I. Disperse Orange 79—87

C.I. Disperse Orange	79	80			81	82
CHEMICAL CLASS	Monoazo	Monoazo			Anthraquinone	Azo
C.I. CONSTITUTION NO.	—	—			—	—
SUBSTRATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	POLYESTER	POLYPROPYLENE*
HUE Artificial Light (tungsten)	Bright Red-dish Orange —	Bright Red-dish Orange redder	Bright Red-dish Orange redder	Bright Red-ish Orange redder	Bright Yellowish Red brighter	Orange little redder
DYEING Methods		N	N, HT	Nc, HT, T	HT	60 min at 97–100°C
Dyeing Properties						
Rate		—	—	—	moderate	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	good	—
Reservation	cotton	—	—	—	4	—
	viscose	—	—	—	4	—
	wool	—	—	—	2–3	—
PRINTING Fixation		—	—	T	PS	—
Dischargeability		✓	✓	—	×	—
FASTNESS Test Methods		ISO	ISO	ISO	AATCC	AATCC
Dry Heat	conditions	—	intermediate	intermediate	—	30 min/120°C
	change	—	5	5	—	5
	staining	—	5	5	—	4–5
Light	source	daylight	daylight	daylight	Carbon arc	Carbon arc
	pale	4	4	5–6	6–7	—
	medium	4–5	4–5	5–6	6–7	4
	heavy	5–6	5–6	—	6–7	—
Nitrogen Oxides		5	4–5	—	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	—	alkaline
	change	4	4–5	5	—	4–5
	staining	4	4–5	4–5	—	4
Pleating (steam)	conditions	—	—	—	—	—
	change	—	—	—	—	—
	staining	—	—	—	—	—
Washing	conditions	ISO 1	ISO 3	ISO 3	III	II
	change	5	4–5	4–5	5	5
	staining	4–5	4	5	5	5
OTHER USES Textile	Acetate: suitable	Nylon, Acrylic: not recommended			Acetate and Triacetate: printing	
Non-Textile						
NOTES						*Unmodified fibre

83	84	85	86	87	C.I. Disperse Orange
Azo —	Azo —	Azo —	Azo —	Azo —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
POLYPROPYLENE* Reddish Orange redder	POLYPROPYLENE* Reddish Orange little redder	POLYPROPYLENE* Orange little change	POLYESTER Bright Reddish Orange redder, brighter	POLYESTER Yellowish Orange yellower	
60 min at 97– 100°C — — — — — — — — —	60 min at 97– 100°C — — — — — — — — —	60 min at 97– 100°C — — — — — — — — —	Nc, HT, T — — — — — — — PS —	Nc, HT — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC 30min/120°C 5 4–5 Carbon arc — 5 — — alkaline 5 3 — — — II 3–4 4	AATCC 30min/120°C 5 3–4 Carbon arc — 4 — — alkaline 4 3–4 — — — II 4–5 3–4	AATCC 30min/120°C 5 5 Carbon arc 4 6 — — alkaline 5 4–5 — — — III 5 3–4	AATCC VI — 4–5 Carbon arc 3–4 — — — alkaline 4–5 — — — III 4–5 —	AATCC III 5 4 Carbon arc 6 6 6 — — — — III 5 —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
			Acetate and Triacetate: printing		OTHER USES Textile Non-Textile
*Unmodified fibre	*Unmodified fibre	*Nickel modified fibre			NOTES

C.I. Disperse Orange 88—91

C.I. Disperse Orange	88	89		90	91
CHEMICAL CLASS	Azo	Monoazo		Monoazo	Disazo
C.I. CONSTITUTION NO.	—	—		—	—
SUBSTRATE	POLYESTER	ACETATE	POLYESTER	POLYESTER	POLYESTER
HUE	Yellowish Orange	—	—	Orange	Bright Reddish Orange
Artificial Light (tungsten)	—	—	—	—	—
DYEING					
Methods	Nc, HT, T	N	Nc, HT	T, (HT)	Nc, HT
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	poor	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	—	—	4	—	—
viscose	—	—	4	—	—
wool	—	—	2	—	—
PRINTING					
Fixation	—	—	—	—	PS
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat	V	—	—	V	V
conditions	—	—	—	5	4-5
change	4	—	—	4-5	4-5
staining					
Light					
source	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
pale	—	—	—	—	—
medium	5	6	5-6	6-7	5
heavy	—	—	—	—	—
Nitrogen Oxides	5	—	—	—	—
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	5
staining	5	5	5	—	—
Pleating					
(steam)	conditions	—	—	—	—
change	—	—	—	—	—
staining	—	—	—	—	—
Washing					
conditions	IVA	I	III	III	III
change	4-5	5	5	5	5
staining	—	5	5	5	5
OTHER USES					
Textile					
Non-Textile					
NOTES					

C.I. Disperse Red 1

C.I. Disperse Red		1					
CHEMICAL CLASS		Monoazo					
C.I. CONSTITUTION NO.		11110					
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	
HUE		Red	Red	Yellowish Red	Red	Bluish Red	
Artificial Light (tungsten)		yellower	yellower	yellower	yellower	yellower	
DYEING Methods		N	N	N	Nc, HT	N	
Dyeing Properties							
Rate		B—rapid	rapid	C—moderate	moderate	moderate	
Temp. range		C—good	good	D—moderate	good	moderate	
Levelling		C—good	good	D—moderate	good	good	
Build-up		B—very good	very good	C—good	good	poor—good	
Reservation	cotton	3	4-5	3	4	—	
	viscose	4	4-5	3-4	4	4	
	wool	2-3	3	2	2	3	
PRINTING							
Fixation		AS	AS	PS	PS, (ASc)	—	
Dischargeability		✓	✓	✓	—	—	
FASTNESS							
Test Methods		ISO	AATCC	ISO	ISO	ISO	ISO
Dry Heat		mild	—	inter.	intermediate	intermediate	intermediate
conditions	change	5	—	3-4	5	4	—
	staining	4-5	—	3	3	3	2
Light		daylight	C. arc	daylight	daylight	daylight	daylight
source	pale	4-5	3	3-4	4	4	4-5
	medium	5	4-5	4	4-5	4-5	5-6
	heavy	5-6	—	4-5	5	4-5	—
Nitrogen Oxides		5	4	5	4-5	5	—
Perspiration		alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	change	5	4-5	5	5	5	5
	staining	3	3	3	4	5	4-5
Pleating (steam)		mild	—	inter.	intermediate	intermediate	intermediate
conditions	change	5	—	4-5	5	4-5	4
	staining	4-5	—	3-4	4	4-5	4-5
Washing		ISO 2	I	ISO 2	ISO 3	ISO 4	ISO 2
conditions	change	4	4-5	4	4	5	5
	staining	3	4-5	3-4	4	5	5
OTHER USES							
Textile		Nylon: Standard component of tertiary mixtures for hosiery (with C.I. Disperse Yellow 3 and C.I. Disperse Blue 3)					
Non-Textile		Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics (e.g. methyl methacrylate) Smokes: For production of coloured smokes					
NOTES		Literature: <i>Vickerstaff</i> , 273, 368, 371, 372, 374 Bird, <i>JSDC</i> , 70 (1954), 74, 76 Bird <i>et al.</i> , <i>JSDC</i> , 71 (1955), 139, 140, 141					

C.I. Disperse Red 2—4

C.I. Disperse Red		2		3		
CHEMICAL CLASS		Monoazo		Anthraquinone		
C.I. CONSTITUTION NO.		11118		60507		
SUBSTRATE		ACETATE	TRIACETATE	ACETATE	NYLON	ACRYLIC
HUE		Yellowish Red	Yellowish Red	Pink	Bluish Pink	Dull Bluish Pink
Artificial Light (tungsten)		little yellower	little yellower	yellower, brighter	yellower, brighter	yellower, brighter
DYEING Methods		N	N, HT	N	N	N
Dyeing Properties						
Rate		moderate	—	C—moderate	moderate	—
Temp. range		good	—	D—moderate	moderate	—
Levelling		—	—	B—very good	very good	—
Build-up		very good	—	D—moderate	moderate	moderate
Reservation						
cotton		3-4	—	—	—	—
viscose		—	—	4-5	4-5	—
wool		1-2	—	3	3	—
PRINTING						
Fixation		—	—	AS	AS	—
Dischargeability		✓	✓	×	×	×
FASTNESS						
Test Methods		ISO	AATCC	ISO	ISO	ISO
Dry Heat						
conditions		—	—	—	intermediate	mild
change		—	—	—	2-3	4
staining		—	—	—	3	4
Light						
source		daylight	C. arc	daylight	daylight	daylight
pale		3-4	4	2	2	4-6
medium		4-5	5	3-4	2-3	4-6
heavy		5-6	5	4	3	—
Nitrogen Oxides		—	5	—	—	—
Perspiration						
acid/alk.		alkaline	—	alkaline	alkaline	alkaline
change		4	—	4	3-4	4-5
staining		1	—	3	2-3	5
Pleating						
(steam)						
conditions		—	—	—	intermediate	intermediate
change		—	—	—	3-4	4
staining		—	—	—	3	3-4
Washing						
conditions		ISO 1	III	ISO 2	ISO 1	ISO 3
change		4	1-2	4	4-5	4
staining		4-5	1	4-5	4	4
OTHER USES						
Textile						
Non-Textile				Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics		
NOTES						

4										C.I. Disperse Red	
Anthraquinone 60755										CHEMICAL CLASS	
ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC		C.I. CONSTITUTION NO.	
Bright Pink		Bright Bluish Pink		Bright Pink		Bright Pink		Bright Pink		SUBSTRATE	
yellower		yellower		yellower		yellower		yellower		HUE	
										Artificial Light (tungsten)	
N		N		N, (HT)		Nc, HT		N		DYEING Methods	
B—rapid B—very good B—very good B—very good		rapid good very good good		B—rapid C—good B—very good C—good		rapid good excellent good		moderate good good poor—moderate		Dyeing Properties Rate Temp. range Levelling Build-up	
— 4 3		— 4 3		— 4 3		— 4 3		— 4 2-3		Reservation cotton viscose wool	
AS ×		AS ×		PS ×		— ×		— ×		PRINTING Fixation Dischargeability	
ISO AATCC		ISO AATCC		ISO AATCC		ISO AATCC		ISO AATCC		FASTNESS Test Methods	
— —		inter. —		intermediate —		inter. III		intermediate —		Dry Heat conditions	
— —		— —		— —		4 —		— —		change	
— —		2 —		2 —		2 3		2 —		staining	
daylight C.arc		daylight C.arc		daylight C.arc		daylight C.arc		daylight C.arc		Light source	
6 —		5 5-6		5-6 5-6		5-6 6-7		5-6 5-6		pale	
6-7 6		5-6 5-6		6 6		6 6-7		6 6		medium	
7 —		6 —		6 6		6-7 6-7		— —		heavy	
4-5 2-3		5 —		4-5 —		5 —		5 —		Nitrogen Oxides	
alkaline alkaline		alkaline —		alkaline —		alkaline —		alkaline —		Perspiration acid/alk.	
4 4-5		4-5 —		4 —		5 —		5 —		change	
3 3-4		4 —		3-4 —		5 —		5 —		staining	
— —		inter. —		intermediate —		inter. —		intermediate —		Pleating conditions	
— —		5 —		5 —		4-5 —		5 —		(steam) change	
— —		3 —		2-3 —		2-3 —		2-3 —		staining	
ISO2 I		ISO2 II		ISO3 —		ISO4 III		ISO3 —		Washing conditions	
3 4		3 3-4		3-4 3-4		4 3		4-5 3		change	
3 2-3		3-4 3-4		3-4 3-4		3 5		5 5		staining	
PVC fibres Acrylic: (AATCC), Light (C.arc), 6; Washing (II), 4-5										OTHER USES Textile	
Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics										Non-Textile	
Should be applied under slightly acid conditions Heavy metal ions in dyebath can give bluer hues										NOTES	

C.I. Disperse Red 5—8

C.I. Disperse Red		5 and 5:1					
CHEMICAL CLASS		Monoazo					
C.I. CONSTITUTION NO.		11215 (5:1 is similar)					
SUBSTRATE		ACETATE	NYLON		TRIACETATE	POLYESTER	ACRYLIC
HUE		Bluish Red	Reddish Violet		Bluish Red	Bluish Red	Dull Reddish Violet
Artificial Light (tungsten)		yellower	yellower		yellower	yellower	yellower
DYEING							
Methods		N	N		N, (HT)	Nc, HT, T	N
Dyeing Properties							
Rate		C—moderate	slow		C—moderate	—	—
Temp. range		E—poor	poor		—	—	—
Levelling		D—moderate	moderate		—	—	—
Build-up		A—excellent	very good		B—very good	—	—
Reservation		—	—		—	—	—
cotton		3-4	4		—	—	—
viscose		2-3	2-3		—	—	—
wool							
PRINTING							
Fixation		AS	AS		PS, (AS)	PS, (ASc)	—
Dischargeability		✓	✓		✓	—	—
FASTNESS							
Test Methods		ISO	AATCC	ISO	AATCC	ISO	ISO
Dry Heat		mild	—	inter.	V	intermediate	intermediate
conditions		5	—	4-5	—	5	5
change		5	—	4	2-3	4-5	3-4
staining							
Light		source	daylight	C. arc	daylight	C. arc	daylight
pale		5-6	3	3	2-3	4-5	5
medium		6	4	3-4	3-4	5	5
heavy		6	—	3-4	—	5	4-5
Nitrogen Oxides		4-5	4	4-5	5	4	—
Perspiration		acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change		5	5	5	—	5	5
staining		3-4	3	3	2-3	4-5	4
Pleating		conditions	mild	—	inter.	—	intermediate
(steam)		change	5	—	5	—	4-5
staining		5	—	4-5	—	4-5	4-5
Washing		conditions	ISO 2	II	ISO 2	II	ISO 3
change		4-5	4	3-4	4	ISO 3	4-5
staining		3-4	4	3-4	4	3-4	5
OTHER USES							
Textile							
Non-Textile		Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics					
NOTES							

6	7		8		C.I. Disperse Red
Monoazo 13379 NYLON Bright Yellowish Red yellower	Monoazo 11150 ACETATE Bright Yellowish Red yellower		Monoazo — ACETATE Reddish Violet→ Bordeaux yellower		TRIACETATE Reddish Violet yellower
		NYLON Bright Red yellower			
					CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N	N	N	N	N	DYEING Methods
slow	rapid	—	A—very rapid	rapid	Dyeing Properties
good	excellent	—	C—good	—	Rate
good	very good	—	D—moderate	—	Temp. range
good	very good	—	A—excellent	very good	Levelling
—	—	—	—	—	Build-up
4	4	—	4-5	—	Reservation
3	3	—	3	—	cotton
					viscose
AS	AS	—	AS	—	wool
✓	✓	—	✓	—	PRINTING Fixation Dischargeability
ISO severe 4-5 4-5	ISO — — —	AATCC — — —	ISO — — —	ISO — — —	FASTNESS Test Methods
daylight 3 3-4 4	daylight 4-5 5 6	C. arc — 5 —	daylight 3-4 3-4 4	daylight 4 4-5 4-5	Dry Heat conditions change staining
—	5	5	4-5	4-5	Light source pale medium heavy
alkaline 5 3-4	alkaline 4 3-4	alkaline 4 —	alkaline 5 3-4	alkaline 5 3-4	Nitrogen Oxides
—	—	—	—	—	Perspiration acid/alk. change staining
—	—	—	—	—	Pleating conditions (steam) change staining
ISO 2. 3-4 3	ISO 1 4 4	I 4-5 4-5	ISO 2 4 3-4	ISO 3 4 3	Washing conditions change staining
	Polyester: Hue—bright reddish orange		Nylon: (Hue, Dull Violet), Light (ISO), 1-2, 2, 2-3		OTHER USES Textile
	Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics		Wool Sheepskins and Furs Plastics: Surface dyeing of thermo- plastics		Non-Textile
					NOTES

C.I. Disperse Red 9—11

C.I. Disperse Red	9				10
CHEMICAL CLASS	Anthraquinone				Azo
C.I. CONSTITUTION NO.	60505				—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	ACRYLIC	ACETATE
HUE	Bright Bluish Red	Bluish Red	Bright Bluish Red	Bluish Red	Bluish Red
Artificial Light (tungsten)	yellower	—	—	—	yellower
DYEING					
Methods	N	N	N	N	—
Dyeing Properties					
Rate	D—slow	very rapid	D—slow	—	rapid
Temp. range	D—moderate	very good	D—moderate	—	poor
Levelling	B—very good	excellent (95°C)	B—very good	—	good
Build-up	C—good	good (95°C)	A—excellent	good	good
Reservation					
cotton	3	4-5	3-4	—	4
viscose	4-5	4-5	3-4	—	4
wool	2	2-3	2-3	—	2
PRINTING					
Fixation	see notes	see notes	see notes	see notes	AS
Dischargeability	×	×	×	×	✓
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	intermediate	intermediate	—	—
change	—	3	5	—	—
staining	—	1-2	3	—	—
Light	source	daylight	daylight	daylight	daylight
pale	4-5	3-4	5	5-6	4-5
medium	4	4	4	5-6	5
heavy	4-5	4	4	—	5-6
Nitrogen Oxides	5	—	4-5	—	5
Perspiration	acid/alk.	alkaline	alkaline	—	alkaline
change	4	5	5	—	4
staining	3	2	4	—	—
Pleating	conditions	severe	intermediate	intermediate	—
(steam)	change	3	5	4	—
staining	—	1-2	2	2	—
Washing	conditions	ISO 2	ISO 3	ISO 2	—
change	ISO 1	3-4	4-5	5	—
staining	3	2-3	4	5	—
OTHER USES					
Textile	Polyester: Light (ISO), 4-5				Nylon: Lower light fastness than on acetate
Non-Textile	Wool Sheepskins and Furs Plastics: Surface dyeing of methyl methacrylate etc. See C.I. Solvent Red 111				
NOTES	Does not find extensive use for printing owing to its tendency to volatilise				

11										C.I. Disperse Red							
Anthraquinone 62015										CHEMICAL CLASS							
ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC		C.I. CONSTITUTION NO.							
Bright Bluish Pink yellower		Bright Reddish Violet† yellower		Bright Bluish Pink† yellower		Reddish Violet yellower		Reddish Violet† yellower		SUBSTRATE							
										HUE							
										Artificial Light (tungsten)							
N		N		N, HT		Nc, HT		N		DYEING Methods							
B—rapid B—very good B—very good B—very good		rapid good very good good		C—moderate C—good C—good B—very good		rapid good good good		rapid good very good good		Dyeing Properties Rate Temp. range Levelling Build-up							
2-3 3-4 2		4 4 2-3		4 4 2-3		3-4 3-4 2		— 4 2-3		Reservation cotton viscose wool							
AS x		AS x		PS, (AS) x		PS, (ASc) x		PS x		PRINTING Fixation Dischargeability							
ISO mild 5 4		ISO inter. 4-5 3-4		ISO inter. 4-5 3-4		ISO intermediate 4-5 3		ISO mild 5 4-5		FASTNESS Test Methods Dry Heat							
AATCC — — —		AATCC — — —		AATCC III 5 4-5						conditions change staining							
daylight 3-4 5 6		daylight 4-5 5 5-6		daylight 3-4 4-5 5		daylight 5 5 5-6		daylight 5-6 6 6		Light							
C.arc 4 5-6 6-7		C.arc 3 4 5		C.arc 4 5 6						source pale medium heavy							
2		4		2		5		—		Nitrogen Oxides							
3-4		—		4-5						Perspiration							
alkaline 4-5 2-3		alkaline 4-5 3		alkaline 4-5 3		alkaline 5 5		alkaline 5 5		acid/alk. change staining							
mild 5 4-5		inter. 4-5 4		inter. 4-5 4-5		intermediate 5 4-5		intermediate 5 4		Pleating (steam)							
AATCC — —		AATCC — —		AATCC inter. 5 2-3						conditions change staining							
ISO 2 4-5 3-4		ISO 2 3-4 3		ISO 3 4 4		ISO 4 4-5 4		ISO 3 4-5 5		Washing							
I 4 3		II 4 3		III 4 2						conditions change staining							
PVC fibres Acrylic: (AATCC), Light (C.arc), 6-7; Washing (II), 4-5																	
Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics; on methyl methacrylate has good light fastness																	
†Tends to give dichroic dyeings on nylon, triacetate and acrylic fibres Literature: <i>Vickerstaff</i> , 272, 273, 368, 371, 374, 375 Bird, <i>JSDC</i> , 70 (1954), 74, 76										OTHER USES Textile							
										Non-Textile							
										NOTES							

C.I. Disperse Red 12—13

C.I. Disperse Red		12			
CHEMICAL CLASS		Monoazo			
C.I. CONSTITUTION NO.		—			
SUBSTRATE		ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE		Bright Yellowish Red	Bright Yellowish Red	Bright Yellowish Red	Bright Yellowish Red
Artificial Light (tungsten)		yellower	yellower	yellower	yellower
DYEING					
Methods		N	N	N, HT	N
Dyeing Properties					
Rate		—	slow	—	—
Temp. range		excellent	good	—	—
Levelling		good	good	—	—
Build-up		good	good	—	—
Reservation					
cotton		4	3	—	—
viscose		4	3	—	—
wool		1-2	2	—	—
PRINTING					
Fixation		AS	AS	PS, (AS)	PS
Dischargeability		✓	✓	✓	—
FASTNESS					
Test Methods		ISO	ISO	ISO	ISO
Dry Heat		—	severe	intermediate	mild
conditions		—	4-5	4-5	5
change		—	4-5	5	5
staining		—	—	—	—
Light		daylight	daylight	daylight	daylight
source		4	4	4-5	5
pale		4-5	5	4-5	5
medium		5	5-6	4-5	—
heavy		—	—	—	—
Nitrogen Oxides		4-5	—	4-5	—
Perspiration		alkaline	alkaline	alkaline	alkaline
acid/alk.		4-5	4-5	4-5	4-5
change		3	2	4	4-5
staining		—	—	—	intermediate
Pleating		—	—	—	4-5
(steam)		—	—	—	5
change		—	—	—	—
staining		—	—	—	—
Washing		ISO 2	ISO 2	ISO 3	ISO 2
conditions		4-5	3-4	4-5	4-5
change		4-5	3	5	5
staining		—	—	—	—
OTHER USES		Not recommended for polyesters			
Textile					
Non-Textile					
NOTES					

13						C.I. Disperse Red
Monoazo						CHEMICAL CLASS
11115						C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC		SUBSTRATE
Bluish Red	Bluish Violet	Bluish Red	Bluish Red	Dull Bluish Violet		HUE
yellower	yellower	yellower	yellower	—		Artificial Light (tungsten)
N	N	N, HT	Nc, HT	N		DYEING Methods
C—moderate E—poor D—moderate A—excellent	moderate poor moderate very good	D—slow D—moderate D—moderate B—very good	moderate moderate moderate very good	slow moderate moderate good		Dyeing Properties Rate Temp. range Levelling Build-up
3 3-4 2	4-5 4 2	3 3-4 2	3 3-4 1-2	— 4 2		Reservation cotton viscose wool
AS ✓	AS ✓	PS, (AS) ✓	PS, (ASc) ✓	PS —		PRINTING Fixation Dischargeability
ISO mild 4-5 4	AATCC — — —	ISO inter. 4 3-4	ISO intermediate 5 3-4	ISO mild 4-5 4-5		FASTNESS Test Methods
daylight 5 5-6 6	C. arc — 5 —	daylight 3 3-4 4	daylight 4 4-5 5	daylight 5 5 5		Dry Heat conditions change staining
4-5	—	5	4-5	5		Light source pale medium heavy
alkaline 4 3	alkaline 4-5 —	alkaline 4-5 3	alkaline 4-5 4	alkaline 4-5 4		Nitrogen Oxides
mild 4-5 4	— —	inter. 5 4	intermediate 5 4	intermediate 5 4		Perspiration acid/alk. change staining
ISO 2 4-5 3-4	I 4 4-5	ISO 2 4 3-4	ISO 3 4 4	ISO 4 5 4		Pleating conditions (steam) change staining
PVC fibres						OTHER USES Textile
Wool Sheepskins and Furs						Non-Textile
Plastics: Surface dyeing of thermoplastics						
Literature: <i>Vickerstaff</i> , 273, 368, 371, 375 Bird, <i>JSDC</i> , 70 (1954), 74, 76						NOTES

C.I. Disperse Red 14—17

C.I. Disperse Red	14	15				
CHEMICAL CLASS		Anthraquinone				
C.I. CONSTITUTION NO.		60710				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Bluish Pink→ Bluish Red yellow	Reddish Violet little yellow	Bluish Red yellow	Bluish Red yellow	Bluish Red yellow
Artificial Light (tungsten)						
DYEING Methods		N	N	N	Nc, HT	N
Dyeing Properties						
Rate		A—very rapid	rapid	A—very rapid	rapid	rapid
Temp. range		C—good	very good	C—good	good	good
Levelling		B—very good	very good	B—very good	very good	excellent
Build-up		B—very good	good	B—very good	very good	good
Reservation	cotton	3	5	3	3	—
	viscose	3-4	4-5	4-5	3-4	4
	wool	3	3	2-3	2	3
PRINTING Fixation	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 3	see notes	see notes	see notes	see notes	see notes
Dischargeability		×	×	×	×	×
FASTNESS						
Test Methods		ISO AATCC	ISO AATCC	ISO AATCC	ISO	ISO
Dry Heat		— —	inter. —	inter. III	intermediate	mild
conditions		— —	3 —	4-5 5	4	4-5
change		— —	2 —	2 4	2	3
staining						
Light		day. C. arc	day. C. arc	day. C. arc	daylight	daylight
source		5 5-6	4 —	5 5-6	5-6	5-6
pale		5-6 6	4-5 3-4	5-6 6	5-6	6
medium		6-7 7	5 —	6-7 6-7	5-6	6-7
heavy						
Nitrogen Oxides		3 4-5	— —	2-3 5	5	5
Perspiration		alk. alk.	alk. alk.	alk. —	alkaline	alkaline
acid/alk.		4-5 4-5	4-5 4	4-5 —	5	5
change		2 3-4	2-3 3-4	2-3 —	5	5
staining						
Pleating		— —	inter. —	inter. inter.	intermediate	intermediate
(steam)		— —	4 —	4-5 4-5	5	4
change		— —	2 —	2 1	2-3	2
staining						
Washing		ISO 2 I	ISO 2 —	ISO 3 III	ISO 4	ISO 3
conditions		3 4-5	3-4 —	4 3-4	3-4	4-5
change		2-3 4	3 —	2-3 1	4	5
staining						
OTHER USES						
Textile						
Non-Textile		Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics				
NOTES		Printing: Of limited use due to tendency to volatilise on steaming Crease resist finishing: Unsuitable Literature: <i>Vickerstaff</i> , 273, 368, 371 Bird, <i>JSDC</i> , 70 (1954), 73, 74, 76				

16	17						C.I. Disperse Red
Monoazo 11225 ACETATE Bluish Red little yellower	Monoazo 11210 ACETATE NYLON TRIACETATE POLYESTER ACRYLIC Red Bluish Red Red Red Bluish Red yellower yellower little yellower yellower little yellower						CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N moderate good good good 4 3 1-2 AS ✓	N B—rapid B—very good C—good B—very good — 4 3-4 AS ✓	N rapid very good very good very good — 4 3-4 AS ✓	N, HT B—rapid C—good B—very good C—good — 4 3 PS, (AS) ✓	Nc, HT rapid good very good very good — 4 3 PS, (ASc) —	N rapid good good good — 4 3 PS —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability	
C* — — — daylight 4 4-5 5 3 — 2-3 — — — — — 3 —	ISO AATCC mild — 5 — 5 — day. C.arc 4-5 3-4 4-5 5 5 6 4-5 4 alk. alk. 4-5 4-5 3 2-3 mild — 5 — 5 — ISO2 I 3-4 4-5 3 4	ISO AATCC inter. V 4-5 — 4 3 day. C.arc 3-4 3 4 4 4-5 — 5 5 alk. alk. 5 — 3 2-3 inter. — 5 — 4-5 — ISO2 II 4 4 3 3	ISO intermediate 4-5 4-5 daylight 3 3-4 4 4-5 5 alkaline 4-5 3-4 intermediate 5 4-5 ISO3 4 4	ISO intermediate 4-5 4 daylight 4 4 4-5 5 alkaline 5 5 intermediate 4-5 5 ISO4 4-5 5	ISO intermediate 4-5 4-5 daylight 5 5 5 alkaline 5 5 intermediate 4-5 4 ISO3 4-5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining	
Nylon: Light fastness lower than on acetate Wool Sheep- skins and Furs	PVC fibres Wool Sheepskins and Furs Plastics: Surface dyeing of methyl methacrylate etc.						OTHER USES Textile Non-Textile
*For details of Tests see Colour Index 2nd Edn, 1956	Literature: Bird <i>et al.</i> , <i>JSDC</i> , 71 (1955), 139-141						NOTES

C.I. Disperse Red 18—23

C.I. Disperse Red	18	19				
CHEMICAL CLASS	Monoazo	Monoazo				
C.I. CONSTITUTION NO.	—	11130				
SUBSTRATE	ACETATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE	Bright Yellowish Red	Yellowish Red	Dull Red	Yellowish Red	Yellowish Red	Dull Red
Artificial Light (tungsten)	yellower	yellower	brighter	yellower	yellower	yellower
DYEING						
Methods	N	N	N	N	Nc, HT	N
Dyeing Properties						
Rate	moderate	C—moderate	moderate	C—moderate	moderate	slow
Temp. range	good	C—good	good	C—good	moderate	poor
Levelling	good	B—very good	good	C—good	very good	moderate
Build-up	good	B—very good	very good	C—good	moderate	poor
Reservation						
cotton	4	3	4	3	—	—
viscose	4	4	4	4	4	3-4
wool	2	2-3	2-3	2-3	3	2
PRINTING						
Fixation	AS	AS	AS	PS, (AS)	—	—
Dischargeability	✓	✓	✓	—	—	—
FASTNESS						
Test Methods	ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat	—	mild	intermediate	intermediate	intermediate	intermediate
conditions	—	5	4-5	5	—	—
change	—	5	4-5	4	4	4
staining	—	5	4-5	4	4	4
Light						
source	daylight	daylight	daylight	daylight	daylight	daylight
pale	4-5	4	3-4	3-4	3-4	5
medium	5	4-5	4	4	4	5-6
heavy	7	5	4-5	4	4-5	—
Nitrogen Oxides	5	5	5	4-5	5	—
Perspiration						
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	4-5	4-5	4-5	5	5
staining	3-4	3	2-3	3-4	5	5
Pleating						
(steam)	—	mild	intermediate	intermediate	intermediate	intermediate
conditions	—	5	5	5	5	4-5
change	—	5	4-5	4-5	4-5	4-5
staining	—	5	4-5	4-5	4-5	4-5
Washing						
conditions	—	ISO 2	ISO 2	ISO 3	ISO 3	ISO 2
change	—	3-4	4	4-5	4-5	5
staining	—	2-3	3-4	4-5	5	5
OTHER USES						
Textile	Nylon: Hue— Bright Red					
Non-Textile	Wool Sheepskins and Furs Plastics	Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics Smokes: Suitable				
NOTES		Of limited use on polyester and acrylic fibres Nylon: Used as component in tertiary mixtures for hosiery dyeing Literature: <i>Vickerstaff</i> , 131, 144, 273, 368, 371 Bird, <i>JSDC</i> , 70 (1954), 74, 76				

20		21		22	23	C.I. Disperse Red
Monoazo		Azo		Anthraquinone 60510	Azoic	CHEMICAL CLASS
ACETATE	NYLON	ACETATE	NYLON	ACETATE	ACETATE	C.I. CONSTITUTION NO.
Bluish Red yellower	Bluish Red yellower	Bluish Red yellower	Reddish Violet yellower	Pink little yellower	Yellowish Red yellower	SUBSTRATE
						HUE Artificial Light (tungsten)
N	N	N	N	N	2Az*	DYEING Methods
rapid	—	rapid	—	E—slow	—	Dyeing Properties
moderate	—	moderate	—	E—poor	moderate	Rate
good	—	good	—	D—moderate	—	Temp. range
good	—	good	—	E—poor	—	Levelling
4	—	—	—	—	4	Build-up
4	—	—	—	4	4	Reservation
1-2	—	—	—	3-4	1-2	cotton viscose wool
AS ✓	AS ✓	AS ✓	AS ✓	— x	— x	PRINTING Fixation Dischargeability
A*	A*	AATCC	AATCC	ISO	ISO	FASTNESS Test Methods
—	—	—	V	—	—	Dry Heat
—	—	—	—	—	—	conditions change staining
—	—	—	3	—	—	
—	—	Carbon arc	Carbon arc	daylight	daylight	Light
4-5	4	3	2-3	6-7	—	source
—	—	5	3	6-7	—	pale
3-4	5	—	—	—	5-6	medium heavy
—	—	5	5	4-5	—	Nitrogen Oxides
3-4	3-4	alkaline	alkaline	alkaline	—	Perspiration
—	—	3	—	5	—	acid/alk. change staining
—	—	3	3	5	—	
—	—	—	—	—	—	Pleating
—	—	—	—	—	—	(steam)
—	—	—	—	—	—	conditions change staining
3-4	3	II	II	ISO 2	—	Washing
—	—	5	5	4	—	conditions change staining
—	—	4	3-4	4-5	—	
Lacquered and plastic articles	Lacquered and plastic articles	Lacquered and plastic articles	Lacquered and plastic articles	Triacetate and polyester: limited usage	Nylon: light fastness (heavy depths) 4-5	OTHER USES Textile Non-Textile
*For details of Tests see Colour Index, 2nd Edn., 1956		Very limited use on nylon due to poor light fastness		Nylon: poor light fastness	Literature: BP 606896 FP 994785 Ital P 414632 *Dye contains own developer (i.e. an azoic combination)	NOTES

C.I. Disperse Red 24—31

C.I. Disperse Red	24	25	26	27	
CHEMICAL CLASS	—	Monoazo	—	—	
C.I. CONSTITUTION NO.	—	—	—	—	
SUBSTRATE	ACETATE	ACETATE	ACETATE	ACETATE	NYLON
HUE	Bluish Red	Red	Red	Bright Bluish Red	Bright Reddish Violet
Artificial Light (tungsten)	yellower	yellower	yellower	little yellower	yellower
DYEING					
Methods	N	N	N	N	N
Dyeing Properties					
Rate	moderate	slow	moderate	rapid	—
Temp. range	moderate	moderate	—	—	—
Levelling	good	—	very good	good	—
Build-up	good	good	good	good	—
Reservation					
cotton	4	4	5	3	—
viscose	4	4	5	3	—
wool	1-2	1-2	4	1-2	—
PRINTING					
Fixation	AS	AS	AS	AS	AS
Dischargeability	✓	✓	✓	✓	✓
FASTNESS					
Test Methods	ISO	ISO	ISO	A*	A*
Dry Heat	conditions	—	—	—	—
change	—	—	—	—	—
staining	—	—	—	—	—
Light	source	daylight	daylight	—	—
pale	5	4-5	4-5	—	—
medium	6	6	5	4	3
heavy	6-7	7	5-6	—	—
Nitrogen Oxides	5	5	4-5	3	5
Perspiration	acid/alk.	alkaline	alkaline	—	—
change	4-5	5	4	3	3
staining	4	4	4	—	—
Pleating	conditions	—	—	—	—
(steam)	change	—	—	—	—
staining	—	—	—	—	—
Washing	conditions	ISO 2	ISO 2	II	II
change	3	3-4	4	3	5
staining	3-4	3-4	3-4	—	—
OTHER USES					
Textile	Nylon: Hue Bluish Red. Light, 4	Nylon			
Non-Textile	Wool Sheepskins and Furs Plastics				
NOTES				*For details of Tests see Colour Index, 2nd Ed., 1956	

28		29	30 and 30:1†		31	C.I. Disperse Red
— —		— —	Monoazo —		Monoazo 11250	CHEMICAL CLASS
ACETATE	NYLON	ACETATE	ACETATE	NYLON	ACETATE	C.I. CONSTITUTION NO.
Bright Red	Bright Bluish Red	Red	Bluish Red	Reddish Violet	Bright Yellowish Red	SUBSTRATE
little yellower	little yellower	little yellower	little change	little change	little yellower	HUE
N	N	N	N	N	N	Artificial Light (tungsten)
rapid	—	rapid	rapid	—	moderate	DYEING
—	—	very good	very good	—	excellent	Methods
good	—	good	good	—	good	Dyeing Properties
good	—	moderate	very good	good	good	Rate
3	—	5	4	—	4	Temp. range
3	—	5	4	—	4	Levelling
1-2	—	3-4	1-2	—	1-2	Build-up
AS	AS	AS	AS	AS	AS	Reservation
✓	✓	✓	✓	✓	✓	cotton
						viscose
						wool
						PRINTING
						Fixation
						Dischargeability
A*	A*	ISO	AATCC	AATCC	ISO	FASTNESS
—	—	—	—	V	—	Test Methods
—	—	—	—	—	—	Dry Heat
—	—	—	—	3	—	conditions
—	—	daylight	Carbon arc	Carbon arc	daylight	change
4	3	4	4	2-3	4	staining
—	—	5	5	2-3	5	Light
—	—	6	—	—	6	source
3	5	4-5	4-5	5	4-5	pale
—	—	alkaline	alkaline	alkaline	alkaline	medium
3	3	5	4	4	5	heavy
—	—	4	3	3	3-4	Nitrogen Oxides
—	—	—	—	—	—	Perspiration
—	—	—	—	—	—	acid/alk.
—	—	—	—	—	—	change
II	II	ISO 1	II	II	ISO 2	staining
3	5	4-5	5	5	4-5	Pleating
—	—	3-4	4	4	3	(steam)
						conditions
						change
						staining
						Washing
						conditions
						change
						staining
						OTHER USES
						Textile
						Non-Textile
						NOTES

*For details of Tests see Colour Index, 2nd Edn., 1956

†Red 30:1 is similar in constitution and properties to Red 30

C.I. Disperse Red 32—35

C.I. Disperse Red		32				
CHEMICAL CLASS		Monoazo				
C.I. CONSTITUTION NO.		11190				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Dull Red	Bordeaux	Dull Yellowish Red	Dull Red	Dull Red
Artificial Light (tungsten)		brighter	little yellower	brighter	brighter	brighter
DYEING						
Methods		N	N	Nc	Nc, HT	N
Dyeing Properties						
Rate		C—moderate	moderate	C—moderate	moderate	moderate
Temp. range		B—very good	good	C—good	good	good
Levelling		B—very good	good	B—very good	very good	very good
Build-up		C—good	good	D—moderate	good	poor→good
Reservation	cotton	—	—	—	—	—
	viscose	4	4	4	4	4
	wool	3	3	2-3	3	2-3
PRINTING						
Fixation		AS	AS	PS, (AS)	PS	PS
Dischargeability		✓	✓	✓	—	—
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	intermediate	intermediate	intermediate	intermediate
	change	—	—	—	—	—
	staining	—	4-5	4	4	4
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	5	2-3	5	5-6	5
	medium	6	3	5-6	6	5
	heavy	6-7	3	—	6	—
Nitrogen Oxides		5	5	5	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	4-5	4-5	4-5	5	5
	staining	3-4	4	4	5	5
Pleating	conditions	—	intermediate	intermediate	intermediate	intermediate
(steam)	change	—	5	5	5	5
	staining	—	5	4-5	4-5	4
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 3	ISO 2
	change	4	4	4	5	5
	staining	3-4	3-4	4	5	5
OTHER USES						
Textile		PVC fibres: Fastness to light lower than on acetate				
Non-Textile		Wool Sheepskins and Furs Plastics: Surface dyeing of thermoplastics				
NOTES						

33	34	35			C.I. Disperse Red
Azoic — ACETATE Bluish Red unchanged	Azo — ACETATE Bright Red little yellower	Monoazo — ACETATE Bright Red yellower			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
2Az (contains own developer) moderate moderate — good 4 4 1-2 — —	N — very good very good good 3-4 3-4 3 AS ✓	N D—slow E—poor C—good C—good — 4-5 3-4 AS ✓	Nc, HT D—slow — — C—good — — — PS ✓	N — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight — — 5-6 — — — — — — — — — —	ISO — — — daylight 4-5 5-6 6 5 alkaline 4 1 — — — ISO 1 4 3	ISO AATCC mild — 5 — 5 — daylight C.arc 5-6 4-5 6 5-6 6-7 — 5 5 alkaline alkaline 5 5 4 5 mild — 5 — 5 — ISO 2 II 5 5 4-5 3	ISO AATCC severe — 4-5 — 4-5 — daylight C.arc 6-7 5-6 6-7 6-7 7 — 5 5 alkaline alkaline 5 5 5 5 severe — 5 — 5 — ISO 3 II 4-5 5 4-5 5	ISO mild 5 5 daylight 7 7 — — alkaline 5 4-5 intermediate 5 5 ISO 2 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon: Light (heavy depths), 4-5	Nylon				OTHER USES Textile Non-Textile
Literature: BP 606896 FP 994785 Ital. P 414632		Alkaline dyebaths should be avoided as these give reduced yield			NOTES

C.I. Disperse Red 36—43

C.I. Disperse Red	36	37	38	39	40	41
CHEMICAL CLASS	Azoic		Monoazo	—	—	Monoazo
C.I. CONSTITUTION NO.	—		—	—	—	11040
SUBSTRATE	ACETATE		ACETATE	ACETATE	ACETATE	ACETATE
HUE	Bordeaux		Bluish Red	Bright Bluish Red	Yellowish Red	Red
Artificial Light (tungsten)	yellower		yellower	yellower	little yellower	yellower
DYEING						
Methods	2Az (contains own developer)		N	N	N	N
Dyeing Properties						
Rate	moderate		—	moderate	moderate	—
Temp. range	moderate		very good	—	poor	moderate
Levelling	—		good	good	good	—
Build-up	good		good	good	very good	moderate
Reservation						
cotton	4		—	5	5	4
viscose	4		4	5	5	4
wool	1-2		3-4	4	3	1-2
PRINTING						
Fixation	—		AS	AS	AS	AS
Dischargeability	×		✓	✓	✓	✓
		This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 13				
FASTNESS						
Test Methods	ISO		ISO	ISO	ISO	ISO
Dry Heat						
conditions	—		—	—	—	—
change	—		—	—	—	—
staining	—		—	—	—	—
Light						
source	daylight		daylight	daylight	daylight	daylight
pale	—		3-4	3	4	—
medium	—		4	4	4-5	4-5
heavy	6-7		4-5	4-5	5	—
Nitrogen Oxides	—		5	5	5	—
Perspiration						
acid/alk.	—		alkaline	alkaline	alkaline	—
change	—		4	4	4	—
staining	—		2	4	2	—
Pleating (steam)						
conditions	—		—	—	—	—
change	—		—	—	—	—
staining	—		—	—	—	—
Washing						
conditions	—		ISO 1	ISO 1	ISO 1	—
change	—		4	4-5	3-4	—
staining	—		4	4-5	3-4	—
OTHER USES						
Textile	Nylon: Light (heavy depths), 6-7		Nylon		Nylon Triacetate: mod. fastness	Nylon
Non-Textile						
NOTES						
	Literature: BP 606896 FP 994785 Ital. P 414632				Not recommended for polyester and acrylic fibres	

42	43 and 43:1†						C.I. Disperse Red
<p>This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 7</p>	Monoazo						CHEMICAL CLASS
	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC		C.I. CONSTITUTION NO.
	Red yellower	Red→ Bluish Red little yellower	Yellowish Red yellower	Red yellower	Bluish Red yellower		SUBSTRATE
							HUE
							Artificial Light (tungsten)
	N	N	N, HT	Nc, HT, T	N		DYEING
							Methods
	B—rapid D—moderate D—moderate B—very good	moderate moderate moderate good	— — — —	— — — —	— — — —		Dyeing Properties
	— 4 2-3	— 4-5 3	— — —	— — —	— — —		Rate
	AS ✓	AS ✓	PS ✓	PS ✓	PS —		Temp. range
							Levelling
							Build-up
							Reservation
							cotton
							viscose
							wool
							PRINTING
							Fixation
							Dischargeability
	ISO AATCC	ISO	ISO AATCC	ISO AATCC	ISO		FASTNESS
	mild —	intermediate	inter. —	inter. —	intermediate		Test Methods
	5 —	5	4-5 —	4-5 —	4		Dry Heat
	5 —	4	4-5 —	4-5 —	4		conditions
	day. C.arc	daylight	day. C.arc	day. C.arc	daylight		change
	4-5 5	3	4 4	4-5 4-5	5-6		staining
	5-6 5-6	3	5 4-5	5 4-5	5-6		Light
	6-7 5-6	3-4	5-6 5	5 5	6		source
	4-5 5	—	5 5	5 —	—		pale
	alk. —	alkaline	alk. —	alk. —	alkaline		medium
	4-5 —	5	4-5 —	4-5 —	5		heavy
	4 —	4	4 —	4-5 —	5		Nitrogen Oxides
	mild —	intermediate	inter. inter.	inter. —	intermediate		Perspiration
	5 —	5	5 4-5	5 —	5		acid/alk.
	5 —	5	5 4-5	5 —	5		change
	ISO2 III	ISO2	ISO3 III	ISO4 III	ISO3		staining
	4 4	4	4-5 4-5	5 5	5		Pleating
	4 1	4	4-5 3-4	4-5 5	4		(steam)
							conditions
							change
							staining
							Washing
							conditions
							change
							staining
	Wool Sheepskins						OTHER USES
							Textile
							Non-Textile
	Very similar to C.I. Disperse Red 56 † Red 43:1 is very similar in structure and properties to Red 43						NOTES

C.I. Disperse Red 44—52

C.I. Disperse Red	44, 45	46	47	48	49
CHEMICAL CLASS		Monoazo		—	
C.I. CONSTITUTION NO.		—		—	
SUBSTRATE		POLYESTER		ACETATE	
HUE Artificial Light (tungsten)		Bright Yellowish Red yellower		Bluish Pink yellower	
DYEING Methods		HT, T		N	
Dyeing Properties					
Rate		—		—	
Temp. range		poor*		—	
Levelling		—		—	
Build-up		—		moderate*	
Reservation		5		—	
cotton		5		5	
viscose		4		—	
wool					
PRINTING Fixation		—	This C.I. Generic Name is discontin- ued. The dyes formerly listed under it now appear under C.I. Disperse Red 4	—	This C.I. Generic Name is discontin- ued
Dischargeability		—		—	
	These C.I. Generic Names are discontin- ued				
FASTNESS Test Methods		ISO		AATCC	
Dry Heat	conditions	severe		—	
change		5		—	
staining		4-5		—	
Light	source	daylight		Carbon arc	
pale		6		6-7	
medium		6-7		6-7	
heavy		7		—	
Nitrogen Oxides		5		—	
Perspiration	acid/alk.	alkaline		alkaline	
change		5		5	
staining		5		4-5	
Pleating	conditions	severe		—	
(steam)	change	4-5		—	
staining		3-4		—	
Washing	conditions	ISO 4		II	
change		4-5		4	
staining		4-5		3-4	
OTHER USES Textile					
Non-Textile					
NOTES		Literature: FP 1164365 FP 1187253 *Maximum build- up obtained at 140°C		*For pale depths only	

50			51	52		C.I. Disperse Red
Monoazo			Azo	—		CHEMICAL CLASS
—			—	—		C.I. CONSTITUTION NO.
ACETATE	NYLON	POLYESTER	ACETATE	ACETATE	NYLON	SUBSTRATE
Red	Bluish Red	Red	Red	Bluish Red	Bluish Red	HUE
yellower	—	yellower	yellower	yellower	yellower	Artificial Light (tungsten)
N	N	Nc, HT	—	N	N	DYEING
—	—	—	—	—	—	Methods
—	—	—	—	—	90–95°C	Dyeing Properties
—	—	—	—	—	—	Rate
—	—	—	—	—	—	Temp. range
—	—	—	—	—	—	Levelling
—	—	—	—	—	—	Build-up
—	—	—	—	—	—	Reservation
—	—	4–5	5	4	4	cotton
—	—	—	—	—	—	viscose
—	—	—	—	—	—	wool
—	—	—	—	—	—	PRINTING
—	—	—	—	—	—	Fixation
—	—	—	—	—	—	Dischargeability
AATCC	AATCC	AATCC	AATCC	AATCC	AATCC	FASTNESS
—	I	III	—	—	I	Test Methods
—	5	—	—	—	4	Dry Heat
—	4	4	—	—	5	conditions
Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	change
—	4	4–5	—	—	—	staining
6–7	4–5	5–6	1	5	4–5	Light
—	—	6	—	—	—	source
5	—	—	4	5	—	pale
alkaline	alkaline	alkaline	alkaline	alkaline	alkaline	medium
4–5	4–5	5	4–5	4–5	5	heavy
4–5	4	5	4–5	4–5	1–2	Nitrogen Oxides
—	—	—	—	—	—	Perspiration
—	—	—	—	—	—	acid/alk.
—	—	—	—	—	—	change
I	—	III	I	I	III	staining
4–5	—	5	4–5	4–5	5	Pleating
4–5	—	5	4–5	4–5	1–2	(steam)
						conditions
						change
						staining
						Washing
						conditions
						change
						staining
Triacetate: suitable						OTHER USES
						Textile
						Non-Textile
						NOTES

C.I. Disperse Red		53							
CHEMICAL CLASS		Anthraquinone							
C.I. CONSTITUTION NO.		—							
SUBSTRATE		ACETATE		TRIACETATE		POLYESTER		ACRYLIC	
HUE		Bright Bluish Red		Bright Bluish Red		Bright Bluish Red		Bluish Red	
Artificial Light (tungsten)		yellower		yellower		yellower		yellower	
DYEING		N		N, Nc, HT		Nc, HT		N	
Methods									
Dyeing Properties									
Rate		—		—		—		—	
Temp. range		—		—		—		—	
Levelling		—		—		—		—	
Build-up		—		—		—		—	
Reservation	cotton	3-4		—		—		—	
	viscose	—		—		—		—	
	wool	2		—		—		—	
PRINTING		—		—		—		—	
Fixation		—		—		—		—	
Dischargeability		—		—		—		—	
FASTNESS		ISO AATCC		ISO AATCC		ISO AATCC		ISO	
Test Methods									
Dry Heat	conditions	—	—	inter.	III	inter.	—	—	—
	change	—	—	5	5	5	—	—	—
	staining	—	—	4-5	4-5	4	—	—	—
Light	source	daylight	C. arc	daylight	C. arc	daylight	C. arc	daylight	
	pale	4	5-6	3-4	4-5	7	7-8	7	
	medium	6	6	5-6	6	7	7-8	7	
	heavy	5	6	6	6	7-8	7-8	—	
Nitrogen Oxides		1	5	3	5	5	5	—	
Perspiration	acid/alk.	alkaline	—	alkaline	—	alkaline	—	alkaline	
	change	4-5	—	5	—	5	—	5	
	staining	1	—	2	—	4-5	—	5	
Pleating (steam)	conditions	—	—	inter.	inter.	inter.	—	—	
	change	—	—	5	5	5	—	—	
	staining	—	—	2-3	2-3	4-5	—	—	
Washing	conditions	ISO 1	III	ISO 3	III	ISO 4	III	ISO 3	
	change	4	2	5	4-5	5	5	5	
	staining	3	1	3-4	2	4	5	5	
OTHER USES									
Textile									
Non-Textile									
NOTES		This dye is sensitive to iron in dyeliquors							

54				C.I. Disperse Red
Monoazo				CHEMICAL CLASS
				C.I. CONSTITUTION NO.
ACETATE	TRIACETATE	POLYESTER	ACRYLIC	SUBSTRATE
Yellowish Red	Yellowish Red	Yellowish Red	Yellowish Red	HUE
bluer	bluer	bluer	bluer	Artificial Light (tungsten)
N	N	Nc, HT, T	N	DYEING
—	—	—	—	Methods
—	—	—	—	Dyeing Properties
—	—	—	—	Rate
—	—	—	—	Temp. range
4-5	4-5	4	—	Levelling
3	3	2-3	—	Build-up
AS	PS, (AS)	PS	PS	Reservation cotton
✓	✓	—	—	viscose
				wool
				PRINTING
				Fixation
				Dischargeability
ISO mild	AATCC	ISO inter.	AATCC	FASTNESS
5	—	5	—	Test Methods
5	—	5	—	Dry Heat conditions
5	—	5	—	change
5	—	5	—	staining
daylight	C.arc	daylight	C.arc	Light source
5	5	4-5	4	pale
6	6	5-6	5	medium
7	7	6	6	heavy
7	7	6-7	6-7	—
5	5	5	5	Nitrogen Oxides
5	5	5	5	Perspiration acid/alk.
alkaline	—	alkaline	—	change
4-5	—	5	—	staining
3-4	—	4-5	4-5	—
5	—	5	—	Pleating conditions
5	—	5	—	(steam) change
5	—	5	—	staining
ISO2	III	ISO3	III	Washing conditions
4-5	3	4	4	change
4	1	4	3-4	staining
				OTHER USES
				Textile
				Non-Textile
				NOTES

C.I. Disperse Red 55—56

C.I. Disperse Red		55 and 55:1†									
CHEMICAL CLASS		Anthraquinone									
C.I. CONSTITUTION NO.		—									
SUBSTRATE		ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC	
HUE		Bright Bluish Red		Bright Bluish Red		Bright Bluish Red		Bluish Red		Bluish Pink	
	Artificial Light (tungsten)	yellower		yellower		yellower		yellower		yellower	
DYEING											
Methods		N		N		N, Nc		Nc, HT, (T*)		N	
Dyeing Properties											
Rate		—		—		—		slow		—	
Temp. range		—		—		—		moderate		—	
Levelling		—		—		—		good		—	
Build-up		—		—		—		good		—	
Reservation	cotton	—		—		—		—		—	
	viscose	—		—		—		—		—	
	wool	—		—		—		—		—	
PRINTING											
Fixation		AS		AS		PS, (AS)		PS		PS	
Dischargeability		x		x		x		x		x	
FASTNESS											
Test Methods		ISO	AATCC	ISO	AATCC	ISO	AATCC	ISO	AATCC	ISO	AATCC
Dry Heat	conditions	mild	—	mild	—	mild	—	inter.	—	mild	—
	change	5	—	4	—	5	—	4	—	5	—
	staining	4-5	—	4	—	4-5	—	2	—	5	—
Light	source	daylight	C. arc	daylight	C. arc	daylight	C. arc	daylight	C. arc	daylight	C. arc
	pale	5	—	4-5	4	4-5	—	6	7	5-6	7
	medium	5-6	6	5-6	5	5-6	4-5	6-7	7-8	6-7	—
	heavy	6	—	6	—	6	—	7	—	—	—
Nitrogen Oxides		4	2-3	4	—	4	3	—	—	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	—	alkaline	—	alkaline	alkaline	alkaline	—
	change	4	4-5	4-5	—	4	—	5	5	4-5	—
	staining	2	3	3	—	3-4	—	5	5	4-5	—
Pleating (steam)	conditions	—	—	—	—	—	—	—	—	—	—
	change	—	—	—	—	—	—	—	—	—	—
	staining	—	—	—	—	—	—	—	—	—	—
Washing	conditions	ISO 1	I	ISO 1	II	ISO 1	IIA	ISO 3	III	ISO 3	IIA
	change	3-4	4-5	4-5	3-4	4-5	4	4-5	5	4-5	4-5
	staining	2-3	3	3-4	3-4	4	4	5	5	4-5	5
OTHER USES											
Textile											
Non-Textile											
NOTES		*Pale dyeings only due to poor fastness to heat treatments †Red 55:1 is similar in structure and properties to Red 55									

56							C.I. Disperse Red
Monoazo							CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	C.I. CONSTITUTION NO.		C.I. CONSTITUTION NO.
Red yellower	Red→ Bluish Red little yellower	Yellowish Red yellower	Red yellower	Bluish Red yellower	SUBSTRATE		SUBSTRATE
					HUE		HUE
					Artificial Light (tungsten)		
N	N	N, HT	Nc, HT, T	N	DYEING		DYEING
					Methods		
B—rapid D—moderate D—moderate B—very good	moderate moderate moderate good	— — — —	— — — —	— — — —	Dyeing Properties		Dyeing Properties
—	—	—	—	—	Rate		Rate
4	4-5	—	—	—	Temp. range		Temp. range
2-3	3	—	—	—	Levelling		Levelling
					Build-up		Build-up
AS ✓	AS ✓	PS ✓	PS ✓	PS —	Reservation		cotton viscose wool
					PRINTING		PRINTING
					Fixation		Fixation
					Dischargeability		Dischargeability
ISO mild 5 5	AATCC — — —	ISO intermediate 5 4	ISO inter. 4-5 4-5	AATCC — — —	ISO intermediate 4 4	FASTNESS	
daylight 4-5 5-6 6-7	C.arc 5 5-6 5-6	daylight 3 3 3-4	daylight 4 5 5-6	C.arc 4 4-5 5	daylight 4-5 5 5	Test Methods	
4-5	5	—	5	5	5	Dry Heat	
alkaline 4-5 4	— — —	alkaline 5 4	alkaline 4-5 4	— — —	alkaline 5 5	conditions	
mild 5 5	— — —	intermediate 5 5	inter. 5 5	inter. 4-5 4-5	inter. 5 5	change	
ISO 2 4 4	III 4 1	ISO 2 4 4	ISO 3 4-5 4-5	III 4-5 3-4	ISO 4 5 4-5	staining	
						Light	
						source	
						pale	
						medium	
						heavy	
						Nitrogen Oxides	
						Perspiration	
						acid/alk.	
						change	
						staining	
						Pleating	
						(steam)	
						conditions	
						change	
						staining	
						Washing	
						conditions	
						change	
						staining	
Wool Sheepskins							OTHER USES
							Textile
							Non-Textile
Very similar to C.I. Disperse Red 43 and Red 43:1							NOTES

C.I. Disperse Red 57—59

C.I. Disperse Red	57	58	
CHEMICAL CLASS		Monoazo	
C.I. CONSTITUTION NO.		11135	
SUBSTRATE		ACETATE	NYLON
HUE		Bright Bluish Red	Bright Bluish Red
Artificial Light (tungsten)		little yellower	little yellower
DYEING			
Methods		N	N
Dyeing Properties			
Rate		—	moderate
Temp. range		80–90°C	moderate
Levelling		—	good
Build-up		—	good
Reservation	cotton	—	—
	viscose	—	4
	wool	—	2–3
PRINTING			
Fixation		AS	AS
Dischargeability		✓	✓
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 53			
FASTNESS		AATCC	ISO AATCC
Test Methods		—	intermediate —
Dry Heat	conditions	—	4–5 —
	change	—	5 —
	staining		
Light	source	Carbon arc	daylight Carbon arc
	pale	—	3 2
	medium	3–4	3–4 —
	heavy	—	3–4 —
Nitrogen Oxides		3–4	— —
Perspiration	acid/alk.	alkaline	alkaline —
	change	3	5 —
	staining	2–3	3–4 —
Pleating	conditions	—	intermediate —
(steam)	change	—	5 —
	staining	—	5 —
Washing	conditions	I	ISO 2 II
	change	4–5	4 4
	staining	3–4	4 4
OTHER USES			
Textile			
Non-Textile			
NOTES			

59										C.I. Disperse Red	
Anthraquinone										CHEMICAL CLASS	
—										C.I. CONSTITUTION NO.	
ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC		SUBSTRATE	
Bright Bluish Red		Bright Bluish Red		Bright Bluish Red		Bluish Red		Bluish Pink		HUE	
yellower		yellower		yellower		yellower		yellower		Artificial Light (tungsten)	
N		N		N, (Nc)		Nc, HT		N		DYEING Methods	
C—moderate D—moderate B—very good D—moderate		moderate moderate very good moderate		slow — — good		— — — —		— — — —		Dyeing Properties Rate Temp. range Levelling Build-up	
— 4-5 3-4		— 3-4 4		— — —		— — —		— — —		Reservation cotton viscose wool	
AS x		AS x		PS, (AS) x		PS, (ASc) x		PS x		PRINTING Fixation Dischargeability	
ISO mild 4-5 3-4		ISO inter. 2 2		ISO inter. 5 3-4		ISO inter. 3-4 1-2		ISO mild 4-5 4		FASTNESS Test Methods	
AATCC —		AATCC —		AATCC —		AATCC II 5 4		AATCC —		Dry Heat conditions change staining	
daylight 5-6 6 6-7		daylight 4 5 5-6		daylight 6 6-7 6-7		daylight 6-7 7 7		daylight 6-7 7 7		Light source pale medium heavy	
C.arc — 6-7 —		C.arc — 4-5 —		C.arc — 4-5 —		C.arc — 7-8 —		C.arc — 7-8 —		Nitrogen Oxides	
3 —		4-5 —		2-3 —		5 4		5 —		Perspiration acid/alk. change staining	
alkaline 5 2-3		alkaline 5 2-3		alkaline 5 3		alkaline alkaline 5 4-5 5 5		alkaline 5 5		Pleating conditions (steam) change staining	
mild 5 4-5		inter. 3-4 2-3		inter. 5 4		inter. 5 3		inter. 4-5 3-4		Washing conditions change staining	
ISO 1 4 3-4		ISO 1 4-5 3-4		ISO 3 3-4 3		ISO 4 5 3-4		ISO 2 5 5		IIA 2-3 1	
PVC fibres and Modacrylic fibres										OTHER USES Textile	
										Non-Textile	
Alkaline dyeliquors should be avoided. Metal ions in the dyebath may cause hues to become bluer. Addition of a sequestering agent (e.g. ethylenediamine tetraacetic acid) will help to prevent this										NOTES	

C.I. Disperse Red 60—65

C.I. Disperse Red		60				61	62	
CHEMICAL CLASS		Anthraquinone				Monoazo		
C.I. CONSTITUTION NO.		—				—		
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE		
HUE		Bright Bluish Red yellower	Bright Bluish Red little yellower	Bright Bluish Red yellower	Bright Bluish Red yellower	Bright Yellowish Red bluer, duller		
Artificial Light (tungsten)								
DYEING Methods		N	N	N, HT, T*	Nc, HT, T*	N		
Dyeing Properties								
Rate		D—slow	slow	D—slow	—	—		
Temp. range		D—moderate	poor	D—moderate	—	good		
Levelling		B—very good	moderate	B—very good	moderate	good		
Build-up		D—moderate	moderate	C—good	good	good		
Reservation								
cotton		4	4	4	3	—		
viscose		4-5	4	4	4-5	—		
wool		2-3	2-3	2	1	—		
PRINTING								
Fixation		AS	AS	PS, (AS)	PS, (ASc)	AS*		
Dischargeability		×	×	×	×	✓		
FASTNESS							This C.I. Generic Name is discontinued	
Test Methods								
Dry Heat		ISO mild 4-5 4	ISO intermediate 3-4 2-3	ISO intermediate 5 4	ISO inter. 4 2-3	AATCC III — 2-3		
Light		source pale medium heavy	daylight 4-5 5 —	daylight 5 6 6-7	day. 6-7 7 7	C. arc 6 6-7 —		Carbon arc — 4 —
Nitrogen Oxides		3-4	5	3-4	5	—		4
Perspiration		acid/alk. change staining	alkaline 5 3-4	alkaline 5 4	alk. 5 4-5 5	alk. 5 5		alkaline — 2-3
Pleating (steam)		conditions change staining	mild 5 4-5	intermediate 4-5 3-4	intermediate 5 4	inter. 5 4-5		— — —
Washing		conditions change staining	ISO 2 4-5 4	ISO 2 4 4	ISO 3 4-5 4	ISO 4 4-5 4		II 5 5
OTHER USES								
Textile								
Non-Textile								
NOTES		*Suitable for pale dyeings only (poor dry heat fastness) Alkaline dyeliquors should be avoided. Metal ions in the dye-bath may cause hue to become bluer. Addition of a sequestering agent (e.g. ethylenediamine tetraacetic acid) will help to prevent this				*Tends to sub-lime in heavy dyeings		

This C.I. Generic Name is discontinued

63	64	65			C.I. Disperse Red			
Monoazo — ACRYLIC Red yellower		Monoazo — ACETATE Dull Red little yellower			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)			
			TRIACETATE Red little brighter	POLYESTER Dull Red little yellower				
N*		N	N, HT	Nc, HT, T	DYEING Methods			
—		—	—	—	Dyeing Properties			
—		—	—	—	Rate			
—		—	—	—	Temp. range			
—		—	—	—	Levelling			
					Build-up			
—		—	4	4	Reservation			
—		—	4	4	cotton			
—		—	2-3	2-3	viscose			
					wool			
PS		AS	PS, (AS)	PS	PRINTING			
—		✓	✓	—	Fixation			
					Dischargeability			
ISO mild 4-5 4	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 58	ISO mild 5 4-5	AATCC — — —	ISO intermediate 5 4	ISO inter. 4-5 4	AATCC II 4-5 5	FASTNESS Test Methods	
daylight 4 4-5 —		daylight 4-5 5 —	C. arc 5 6 —	daylight 4-5 6 7	daylight 5-6 6 6-7	C. arc 5 5-6 —	Dry Heat	conditions change staining
5		4-5	4-5	4-5	5	5	Light	source pale medium heavy
alkaline 5 4		alkaline 5 3	alkaline 4-5 5	alkaline 5 4	alkaline 5 5	alkaline 4-5 5	Nitrogen Oxides	
intermediate 4 3-4		mild 5 4-5	— — —	intermediate 5 4-5	inter. 5 4-5	— — —	Perspiration	acid/alk. change staining
ISO 2, 5 5		ISO 2 4 3	II 4 3	ISO 3 4-5 3-4	ISO 4 4-5 4-5	III 5 5	Pleating (steam)	conditions change staining
							Washing	conditions change staining
			PVC fibres Wool/Polyester blends: stain on wool is on tone				OTHER USES	Textile
								Non-Textile
*Apply from neutral liquors; acid dyebaths give oranges								NOTES

C.I. Disperse Red 66—70

C.I. Disperse Red	66	67	68
CHEMICAL CLASS	Anthraquinone		
C.I. CONSTITUTION NO.	—		
SUBSTRATE	ACETATE	TRIACETATE	
HUE	Bright Red→Bluish Pink —	Bright Red —	
Artificial Light (tungsten)			
DYEING			
Methods	N	N	
Dyeing Properties			
Rate	moderate	—	
Temp. range	very good	—	
Levelling	—	—	
Build-up	moderate	—	
Reservation			
cotton	—	—	
viscose	—	—	
wool	—	—	
PRINTING			
Fixation	AS	PS	
Dischargeability	×	×	
FASTNESS			This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 60
Test Methods	AATCC	AATCC	
Dry Heat	conditions	—	
change	—	—	
staining	—	—	
Light	Carbon arc	Carbon arc	
source	—	—	
pale	4	4	
medium	—	—	
heavy	—	—	
Nitrogen Oxides	5	5	
Perspiration	acid/alk.	—	This C.I. Generic Name is discontinued
change	—	—	
staining	—	—	
Pleating	conditions	—	
(steam)	change	—	
staining	—	—	
Washing	conditions	—	
change	—	—	
staining	—	—	
OTHER USES			
Textile	Nylon: (AATCC) light, 3 Acrylic: (AATCC) light, 3		
Non-Textile			
NOTES			

69			70			C.I. Disperse Red
Anthraquinone			Anthraquinone			CHEMICAL CLASS
—			—			C.I. CONSTITUTION NO.
ACETATE	TRIACETATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	SUBSTRATE
Bluish Red	Bluish Red	Bluish Red	Bluish Red	Bluish Red	Bluish Red	HUE
—	—	—	—	—	—	Artificial Light (tungsten)
N	N	Nc, HT, T	N	N	Nc, HT, T	DYEING
—	—	—	—	—	—	Methods
—	—	—	—	—	—	Dyeing Properties
—	—	—	—	—	—	Rate
—	—	—	—	—	—	Temp. range
—	—	—	—	—	—	Levelling
—	—	—	—	—	—	Build-up
—	—	—	—	—	—	Reservation
—	—	—	—	—	—	cotton
—	—	—	—	—	—	viscose
—	—	—	—	—	—	wool
—	—	—	—	—	—	PRINTING
—	—	—	—	—	—	Fixation
—	—	—	—	—	—	Dischargeability
AATCC	AATCC	AATCC	AATCC	AATCC	AATCC	FASTNESS
—	—	—	—	—	—	Test Methods
—	—	—	—	—	—	Dry Heat
—	—	—	—	—	—	conditions
Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	change
4	4	4	4	4	4	staining
—	—	—	—	—	—	Light
4	4	—	4	4	—	source
alkaline	alkaline	—	alkaline	alkaline	—	pale
5	5	—	5	5	—	medium
—	—	—	—	—	—	heavy
—	—	—	—	—	—	Nitrogen Oxides
—	—	—	—	—	—	Perspiration
—	—	—	—	—	—	acid/alk.
—	—	—	—	—	—	change
—	—	—	—	—	—	staining
—	—	—	—	—	—	Pleating
—	—	—	—	—	—	(steam)
—	—	—	—	—	—	conditions
—	—	—	—	—	—	change
—	—	—	—	—	—	staining
—	—	—	—	—	—	Washing
—	—	—	—	—	—	conditions
—	—	—	—	—	—	change
—	—	—	—	—	—	staining
Nylon: Hue—Reddish Violet; (AATCC) light, 3			Nylon: Hue—Bluish Violet; (AATCC) light, 3			OTHER USES
						Textile
						Non-Textile
						NOTES

C.I. Disperse Red 71—74

C.I. Disperse Red	71	72			
CHEMICAL CLASS		Monoazo			
C.I. CONSTITUTION NO.		—			
SUBSTRATE		ACETATE	TRIACETATE		POLYESTER
HUE		Red	Red		Dull Red
Artificial Light (tungsten)		little yellower	little yellower		little yellower
DYEING					
Methods		N	N, Nc, HT		Nc, HT, T
Dyeing Properties					
Rate		—	—		moderate
Temp. range		—	—		—
Levelling		—	—		—
Build-up		—	—		—
Reservation	cotton	4-5	4-5		—
	viscose	—	—		—
	wool	3-4	3-4		—
PRINTING					
Fixation		AS	PS		PS, T
Dischargeability		—	—		—
	This C.I. Generic Name is discontinued				
FASTNESS					
Test Methods		ISO	AATCC	ISO	AATCC
Dry Heat	conditions	—	—	inter.	III
	change	—	—	4-5	5
	staining	—	—	5	5
Light	source	daylight	C. arc	daylight	C. arc
	pale	6	6	5-6	5-6
	medium	6-7	6-7	6	6
	heavy	7	7	6-7	6-7
Nitrogen Oxides		4-5	5	4-5	5
Perspiration	acid/alk.	alkaline	—	alkaline	—
	change	4-5	—	4-5	—
	staining	3	—	4	—
Pleating (steam)	conditions	—	—	inter.	—
	change	—	—	5	—
	staining	—	—	4-5	—
Washing	conditions	ISO 1	III	ISO 3	III
	change	4-5	4-5	4-5	5
	staining	4-5	1	4	2
OTHER USES					
Textile					
Non-Textile					
NOTES					

73						74						C.I. Disperse Red	
Monoazo						— —						CHEMICAL CLASS	
—												C.I. CONSTITUTION NO.	
ACETATE		TRIACETATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	SUBSTRATE		HUE				
Bright Bluish Red yellower		Bright Bluish Red yellower	Bright Bluish Red yellower	Bright Yellowish Red yellower	Bright Yellowish Red yellower	Bright Yellowish Red yellower	Artificial Light (tungsten)						
N		N, Nc, HT	Nc, HT, T	N	N, Nc, HT	Nc, HT, T	DYEING Methods						
— moderate — good		moderate moderate — very good	moderate moderate — very good	— — — —	— — — —	— — — —	Dyeing Properties						
4-5 — 3		4-5 — 3	— — —	4 — 2	4 — 2	— — —	Rate						
							Temp. range						
							Levelling						
							Build-up						
AS —		PS —	PS, T —	AS —	PS —	PS —	Reservation		cotton viscose wool				
							PRINTING						
							Fixation						
							Dischargeability						
ISO AATCC		ISO AATCC	ISO AATCC	ISO AATCC	ISO AATCC	ISO AATCC	FASTNESS						
— —		inter. III	inter. III	— —	inter. —	— —	Test Methods						
— —		5 —	5 —	— —	5 —	— —	Dry Heat		conditions				
— —		5 5	5 5	— —	5 —	— —	change		staining				
day. C.arc		day. C.arc	day. C.arc	day. C.arc	day. C.arc	day. C.arc	Light		source				
5-6 5		4-5 4-5	6 7	4 4-5	3 3-4	4-5 4-5	pale		medium				
6-7 5-6		5 5	6 7	5-6 5	4-5 4-5	5-6 5-6	heavy						
7 6-7		7 6	6-7 7	6-7 6	6 5-6	6 5-6							
4-5 5		4-5 5	— 5	5 5	4 5	5 5	Nitrogen Oxides						
alk. alk.		alk. alk.	alk. alk.	alk. —	alk. —	alk. —	Perspiration		acid/alk.				
4-5 5		4-5 5	5 5	4-5 —	5 —	4-5 —	change		staining				
3 2-3		4-5 4	5 5	2-3 —	4-5 —	4-5 —	Pleating		conditions				
— —		inter. —	severe —	— —	inter. —	— —	(steam)		change				
— —		5 —	5 —	— —	5 —	— —	staining						
— —		5 —	4-5 —	— —	5 —	— —	Washing		conditions				
ISO1 III		ISO3 III	ISO3 III	ISO1 III	ISO3 III	ISO3 III	change		staining				
5 4		4-5 5	5 5	5 4	4-5 4	5 5							
4-5 1		4-5 3	5 5	5 3	5 5	5 5							
Nylon Acrylic												OTHER USES	
												Textile	
												Non-Textile	
												NOTES	

C.I. Disperse Red 75—81

C.I. Disperse Red	75	76			
CHEMICAL CLASS	Anthraquinone	Monoazo			
C.I. CONSTITUTION NO.	—	—			
SUBSTRATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	ACRYLIC
HUE	Bright Bluish Red	Bluish Red	Bluish Red	Bluish Red	Dull Violet
Artificial Light (tungsten)	yellower	yellower	yellower	yellower	redder
DYEING Methods	Nc, HT	N	N, HT	Nc, HT, T	N
Dyeing Properties					
Rate	—	C—moderate	—	—	—
Temp. range	—	D—moderate	—	—	—
Levelling	—	C—good	—	—	—
Build-up	—	B—very good	—	—	—
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	—	—
PRINTING					
Fixation	—	AS	PS	PS	PS
Dischargeability	—	✓	✓	—	—
FASTNESS					
Test Methods					
Dry Heat	conditions	ISO	ISO	ISO	ISO
change	intermediate	mild	intermediate	intermediate	mild
staining	4-5	5	5	4-5	5
	2-3	5	4	4-5	5
Light	source	daylight	daylight	daylight	daylight
pale	6-7	5-6	5	5-6	6-7
medium	6-7	6	5-6	6	6-7
heavy	6-7	6-7	6	6	7
Nitrogen Oxides	—	4-5	4-5	5	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
change	4-5	4-5	5	5	5
staining	5	3-4	4	5	4
Pleating	conditions	intermediate	mild	intermediate	intermediate
(steam)	change	5	5	5	5
staining	4-5	5	5	5	5
Washing	conditions	ISO 2	ISO 3	ISO 4	ISO 3
change	ISO 4	4	5	4-5	5
staining	3-4	3	3	5	5
OTHER USES					
Textile					
Non-Textile					
NOTES					

77	78	79	80	81	C.I. Disperse Red
— — POLYESTER Bluish Red much bluer		— — ACETATE Red —	— — ACETATE Red yellower	Monoazo — NYLON Bright Red —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT — — — — 4 4 2 — —	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 50	— — excellent — — — — — AS ✓	— — excellent — — — — — AS ✓	N — — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC — — — Carbon arc 6 6-7 — — — — — — III 5 5		ISO — — — daylight 5 5-6 — 4-5 alkaline 4-5 4-5 — — — ISO1 4-5 4	ISO — — — daylight 4-5 5-6 — 4-5 alkaline 4 3-4 — — — ISO1 4-5 4-5	ISO — — — daylight — — — — alkaline 5 5 — — — ISO3 3-4 3	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Also on acetate, nylon, triacetate		Triacetate			OTHER USES Textile Non-Textile
			Fast to diazotisation		NOTES

C.I. Disperse Red 82—86

C.I. Disperse Red	82			83	84
CHEMICAL CLASS	Monoazo				Monoazo
C.I. CONSTITUTION NO.	—				—
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER		POLYESTER
HUE	Bluish Red	Bluish Red	Bluish Red		Bluish Red
Artificial Light (tungsten)	yellower	yellower	yellower		yellower
DYEING					
Methods	N	N, Nc, HT	Nc, HT, T		HT
Dyeing Properties			HT method		HT method
Rate	—	—	—		—
Temp. range	—	—	—		—
Levelling	—	—	moderate		moderate
Build-up	—	—	good		good*
Reservation					
cotton	—	—	4-5		3
viscose	—	—	4-5		3
wool	—	—	3		1
PRINTING				This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 60	
Fixation	—	—	—		PS
Dischargeability	—	—	—		✓
FASTNESS					
Test Methods	ISO	ISO	ISO		ISO
Dry Heat	mild	intermediate	intermediate		intermediate
conditions	5	4-5	5		4-5
change	5	4-5	4-5		5
staining					
Light	daylight	daylight	daylight		daylight
source	6	5-6	6		5-6
pale	6-7	6	6-7		5-6
medium	6-7	6	6-7		5-6
heavy					
Nitrogen Oxides	5	4-5	5		—
Perspiration	acid/alk.	alkaline	alkaline		alkaline
change	5	4-5	5		5
staining	4	4	5		4-5
Pleating	conditions	mild	intermediate		intermediate
(steam)	change	5	5		5
staining	5	4-5	5		5
Washing	conditions	ISO 1	ISO 3		ISO
change	5	4-5	4-5		4-5
staining	4-5	4	4-5		5
OTHER USES					
Textile					
Non-Textile					
NOTES					*Build-up by carrier dyeing—poor

85				86	C.I. Disperse Red
Monoazo				Anthraquinone — POLYESTER	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE
ACETATE Yellowish Red little change	NYLON Red brighter	TRIACETATE Yellowish Red brighter	POLYESTER Yellowish Red little change	Bluish Pink yellower	HUE Artificial Light (tungsten)
N C—moderate C—good D—moderate C—good 3 4 1 AS ✓	— — — — — — — AS —	N, Nc, HT A—very rapid C—good E—poor B—very good 3 4 1 PS ✓	(Nc), HT, T HT method — — moderate very good — — — PS —	HT, T, (Nc) — 120–140°C* — — 4–5 4–5 3 PS, T ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 4 5–6 6 5 alkaline 5 4 — — — ISO 3 5 5	ISO — — — daylight 4–5 5 — 5 alkaline 4 3 intermediate 5 4 ISO 2 4–5 4–5	ISO intermediate 5 4–5 daylight 3–4 5 6 5 alkaline 5 5 intermediate 5 5 ISO 3 5 5	ISO intermediate 4–5 4 daylight 4–5 5 5–6 — alkaline 5 5 intermediate 5 5 ISO 4 4–5 5	ISO AATCC inter. V 4–5 5 4–5 4–5 daylight C. arc 6–7 7 7 7 7–8 — 5 — alkaline alkaline 4–5 5 5 5 severe — 5 — 5 — ISO 4 III 4–5 5 4–5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
				Nylon: pale dye- ings. Triacetate	OTHER USES Textile Non-Textile
				*Maximum build-up obtained at 140°C Sensitive to alkali Good fastness to durable press finishing	NOTES

C.I. Disperse Red 87—90

C.I. Disperse Red	87		88			
CHEMICAL CLASS	Anthraquinone		Monoazo			
C.I. CONSTITUTION NO.	—		—			
SUBSTRATE	NYLON	POLYESTER	ACETATE	TRIACETATE	POLYESTER	
HUE	Bluish Pink	Bluish Pink	Bluish Red	Bluish Red	Bluish Red	
Artificial Light (tungsten)	—	—	yellower	yellower	yellower	
DYEING						
Methods	N	HT, T, (Nc)	N	Nc, HT, T	HT, T, (Nc)	
Dyeing Properties						
Rate	—	—	—	—	—	
Temp. range	—	—	—	—	—	
Levelling	—	—	—	—	—	
Build-up	—	—	—	—	—	
Reservation						
cotton	—	—	—	4	—	
viscose	—	—	—	4	—	
wool	—	—	—	2	—	
PRINTING						
Fixation	AS	PS	AS	PS	PS, T	
Dischargeability	×	×	√	√	—	
FASTNESS						
Test Methods	AATCC	AATCC	AATCC	ISO AATCC	ISO AATCC	ISO AATCC
Dry Heat	—	—	—	severe —	severe —	—
conditions	—	—	—	4-5	4	—
change	—	—	—	4	4	—
staining	—	—	—	—	—	—
Light	Carbon arc	Carbon arc	Carbon arc	day. C. arc	day. C. arc	day. C. arc
source	5-6	5-6	5-6	5-6	5-6	5
pale	6	6	5-6	6	5-6	5-6
medium	6-7	6-7	—	6	—	—
heavy	—	—	—	—	—	—
Nitrogen Oxides	5	5	5	4-5	5	—
Perspiration	—	—	alkaline	alk. alk.	alk. alk.	alk. alk.
acid/alk.	—	—	5	5	5	5
change	—	—	5	4	5	5
staining	—	—	—	—	—	—
Pleating	—	—	—	severe	—	severe
(steam)	—	—	—	5	—	5
conditions	—	—	—	5	—	—
change	—	—	—	—	—	—
staining	—	—	—	—	—	—
Washing	—	—	II	ISO3 II	ISO4 III	—
conditions	—	—	5	4-5	5	5
change	—	—	3	4	5	5
staining	—	—	—	—	—	—
OTHER USES						
Textile	Acetate, triacetate: Suitable for dyeing and printing		Nylon, acrylic, modacrylic: Suitable			
Non-Textile						
NOTES			Good fastness to durable press finishing			

89	90			C.I. Disperse Red
Oxazine — POLYESTER Yellowish Pink (fluorescent) yellower	Monoazo — ACETATE Red — TRIACETATE Red — POLYESTER Red —			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
T — — — — — — — PS, T —	N — — — — — — — —	N, HT, T — — — — — — — —	Nc, HT, T — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO severe 5 5 daylight 5-6 5-6 5 4 alkaline 5 5 intermediate 5 5 ISO 4 4-5 5	ISO — — — daylight 6 6 6-7 5 alkaline 4-5 4-5 — — — ISO 1 5 4-5	ISO severe 5 5 daylight 6-7 6-7 6-7 5 alkaline 5 4-5 intermediate 4 5 ISO 3 4-5 4-5	ISO severe 4-5 4 daylight 6 6-7 6-7 5 alkaline 5 5 severe 5 4 ISO 4 5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Suitable only for polyesters	Nylon: poor light fastness			OTHER USES Textile Non-Textile
				NOTES

C.I. Disperse Red 91—92

C.I. Disperse Red	91			
CHEMICAL CLASS C.I. CONSTITUTION NO.	Anthraquinone			
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER
HUE	Bluish Pink	Bluish Pink	Bluish Pink	Bluish Pink
Artificial Light (tungsten)	yellower	yellower	yellower	yellower
DYEING				
Methods	N	N	N, HT	Nc, HT
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	—	—	—	—
Reservation cotton viscose wool	— — —	— — —	— — —	— — —
PRINTING				
Fixation	AS	AS	PS, (AS)	PS
Dischargeability	X	X	X	X
FASTNESS				
Test Methods	ISO	ISO	ISO	ISO
Dry Heat conditions change staining	— — —	mild 4 3	intermediate 4-5 4-5	intermediate 4-5 3-4
Light source pale medium heavy	daylight 5 5-6 6	daylight 4-5 5-6 —	daylight 5-6 6 6-7	daylight 6 6-7 7
Nitrogen Oxides	3-4	—	4-5	—
Perspiration acid/alk. change staining	alkaline 4-5 3-4	alkaline 4 3-4	alkaline 4-5 4	alkaline 5 5
Pleating conditions (steam) change staining	— — —	— — —	— — —	severe 4-5 4
Washing conditions change staining	ISO 1 4 4	ISO 1 4 4	ISO 3 4-5 4-5	ISO 4 4-5 4
OTHER USES				
Textile				
Non-Textile				
NOTES				

Anthraquinone				CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Bluish Red yellow	Reddish Violet yellow	Bluish Red yellow	Bluish Red yellow	SUBSTRATE
				HUE
				Artificial Light (tungsten)
—	—	Nc	(Nc), HT, T	DYEING
				Methods
—	—	—	—	Dyeing Properties
—	—	—	—	Rate
—	—	—	—	Temp. range
—	—	—	—	Levelling
—	—	—	—	Build-up
—	—	—	—	Reservation
—	—	—	—	cotton
—	—	—	—	viscose
—	—	—	—	wool
AS	AS	—	PS, T	PRINTING
x	x	x	x	Fixation
				Dischargeability
ISO	ISO	ISO	ISO	FASTNESS
—	—	mild	intermediate	Test Methods
—	—	4-5	4-5	Dry Heat
—	—	4-5	4-5	conditions
—	—	—	daylight	change
—	—	—	6-7	staining
—	—	—	6-7	Light
—	—	—	6-7	source
4	—	3-4	—	pale
alkaline	alkaline	alkaline	alkaline	medium
4-5	4-5	4-5	5	heavy
4	4	4-5	4-5	Nitrogen Oxides
—	—	—	intermediate	Perspiration
—	—	—	4-5	acid/alk.
—	—	—	5	change
ISO1	ISO1	ISO3	ISO4	staining
4-5	4-5	4-5	4-5	Pleating
5	5	4-5	4-5	(steam)
				conditions
				change
				staining
				Washing
				conditions
				change
				staining
				OTHER USES
				Textile
				Non-Textile
				NOTES

C.I. Disperse Red 93—96

C.I. Disperse Red	93				94	95
CHEMICAL CLASS	Anthraquinone				Anthraquinone	
C.I. CONSTITUTION NO.	—				—	
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER	
HUE	Bluish Red	Reddish Violet	Bluish Red	Bluish Red	Bright Red	
Artificial Light (tungsten)	yellower	yellower	yellower	yellower	yellower	
DYEING						
Methods	N	N	N, Nc	(Nc), HT, T	Nc, HT, T	
Dyeing Properties						
Rate	—	—	—	—	—	
Temp. range	—	—	—	—	—	
Levelling	—	—	—	—	—	
Build-up	—	—	—	—	—	
Reservation						
cotton	—	—	—	—	—	
viscose	—	—	—	—	—	
wool	—	—	—	—	—	
PRINTING						
Fixation	AS	AS	PS	PS	PS	
Dischargeability	×	×	×	×	×	
FASTNESS						This C.I. Generic Name is discontinued
Test Methods	ISO	ISO	ISO	ISO	ISO	
Dry Heat	conditions	—	mild	intermediate	intermediate	
change	—	—	4-5	4-5	4-5	
staining	—	—	3-4	3	3	
Light	source	—	—	daylight	daylight	
pale	—	—	—	6-7	7	
medium	—	—	—	6	7	
heavy	—	—	—	6	7	
Nitrogen Oxides	3-4	—	3-4	—	—	
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	
change	4-5	4	4-5	5	5	
staining	3-4	3-4	4	5	5	
Pleating (steam)	conditions	—	—	intermediate	intermediate	
change	—	—	—	4-5	4-5	
staining	—	—	—	5	4-5	
Washing	conditions	ISO 1	ISO 3	ISO 4	ISO 4	
change	4-5	4	4-5	4-5	4-5	
staining	3-4	3-4	4-5	4	3-4	
OTHER USES						
Textile						
Non-Textile						
NOTES						

96						C.I. Disperse Red
Anthraquinone						CHEMICAL CLASS
—						C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC		SUBSTRATE
Pink	Bluish Pink	Pink	Bluish Pink	Pink		HUE
little yellower	—	—	—	—		Artificial Light (tungsten)
N	N	N	Nc, HT	N		DYEING
						Methods
—	—	—	—	—		Dyeing Properties
—	—	—	—	—		Rate
—	—	—	—	—		Temp. range
—	—	—	—	—		Levelling
—	—	—	—	—		Build-up
—	—	—	—	—		Reservation
—	—	—	—	—		cotton
—	—	—	—	—		viscose
—	—	—	—	—		wool
AS	AS	PS	PS	AS		PRINTING
x	x	x	x	x		Fixation
						Dischargeability
ISO	ISO	ISO	ISO	AATCC	ISO	FASTNESS
mild	mild	intermediate	inter.	—	mild	Test Methods
5	5	4-5	4-5	—	5	Dry Heat
5	4-5	4	2-3	—	5	conditions
						change
						staining
daylight	daylight	daylight	day.	C.arc	daylight	Light
5	3-4	4	6-7	—	5	source
5-6	4	5	6-7	5	5-6	pale
6	4-5	5-6	6-7	—	5-6	medium
						heavy
3	—	3	—	—	—	Nitrogen Oxides
alkaline	alkaline	alkaline	alk.	alk.	alkaline	Perspiration
5	5	5	5	4	5	acid/alk.
3-4	3	4-5	5	5	5	change
						staining
mild	intermediate	intermediate	inter.	—	intermediate	Pleating
5	5	5	5	—	5	(steam)
5	4	4	4	—	4	conditions
						change
						staining
ISO 2	ISO 2	ISO 3	ISO 4	III	ISO 3	Washing
4	3-4	4	5	4	5	conditions
4	3-4	4	4	5	5	change
						staining
						OTHER USES
						Textile
						Non-Textile
						NOTES

C.I. Disperse Red 97—102

C.I. Disperse Red	97			98		
CHEMICAL CLASS	Monoazo			Monoazo		
C.I. CONSTITUTION NO.	—			—		
SUBSTRATE	TRIACETATE	POLYESTER	ACRYLIC	ACETATE	NYLON	POLYESTER
HUE	Red	Red	Bluish Red	Red	Bluish Red	Red
Artificial Light (tungsten)	little change	little change	little yellower	yellower	yellower	yellower
DYEING						
Methods	N	(Nc), HT	N	N	N	Nc, HT
Dyeing Properties						
Rate	—	—	—	B—rapid	rapid	—
Temp. range	—	—	—	B—v. good	very good	—
Levelling	—	—	—	C—good	good	—
Build-up	—	—	—	A—excellent	very good	—
Reservation						
cotton	—	—	—	—	—	—
viscose	—	—	—	4	4	—
wool	—	—	—	3-4	3	—
PRINTING						
Fixation	—	—	—	—	—	—
Dischargeability	—	—	—	✓	✓	—
FASTNESS						
Test Methods						
Dry Heat	ISO severe	ISO severe	ISO mild	ISO —	ISO intermediate	ISO intermediate
conditions	5	4	5	—	4	4
change	4	3-4	5	—	3	2-3
staining						
Light	daylight	daylight	daylight	daylight	daylight	daylight
source	3-4	5-6	4-5	4-5	3-4	4
pale	4	6	5-6	4-5	4	4-5
medium	4-5	6-7	6	5	4	4-5
heavy						
Nitrogen Oxides	4-5	—	—	4	—	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	5	5	5	5
change	4	5	4	3-4	3	5
staining						
Pleating	severe	severe	intermediate	—	intermediate	intermediate
(steam)	5	5	5	—	4	5
change	4-5	5	5	—	3-4	4-5
staining						
Washing	ISO 2	ISO 4	ISO 2	ISO 1	ISO 1	ISO 4
conditions	4	5	5	5	4-5	5
change	3-4	4	5	4	4	4
staining						
OTHER USES						
Textile	Acetate: light (ISO), 3-4, 4, 5; wet fastness—average					
Non-Textile	Nylon: light (ISO), 2, 2-3, 3-4					
NOTES						

99	100			101	102		C.I. Disperse Red
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 50	Azo —			This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 50	Azo —		CHEMICAL CLASS
	ACETATE Bluish Red —	TRIACETATE Bluish Red —	POLYESTER Bluish Red —		TRIACETATE Yellowish Red —	POLYESTER Yellowish Red —	C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 50	N — — — 4 — 2 — —	N — — — 4 — 2 — —	Nc, HT — — — 4 — 2 — —		N — — — — — 3 3 2 — —	Nc, HT — — — — — 3 3 2 — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	AATCC I 5 5 Carbon arc — 6-7 — — alkaline 4 — — — — II 4 —	AATCC I 5 5 Carbon arc — 7 — — alkaline 4 — — — — II 4-5 —	AATCC III — 3 Carbon arc — 6-7 6-7 7 — alkaline 5 — — — — III 5 —		AATCC I — 4-5 Carbon arc — 6-7 — — alkaline 4-5 — — — — — — —	AATCC I — 4-5 Carbon arc — 6-7 — — alkaline 5 — — — — — — —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
							OTHER USES Textile Non-Textile
							NOTES

C.I. Disperse Red 103—105

C.I. Disperse Red		103				
CHEMICAL CLASS		Monoazo				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Red	Bluish Red	Red	Red	Bluish Red
Artificial Light (tungsten)		yellower	yellower	yellower	yellower	yellower
DYEING						
Methods		N	N	N, Nc	Nc, HT	N
Dyeing Properties					HT method	
Rate		C—moderate	—	—	—	—
Temp. range		D—moderate	—	—	—	—
Levelling		C—good	—	—	moderate	—
Build-up		B—very good	—	—	very good	—
Reservation	cotton	—	—	—	3	—
	viscose	—	—	—	3	—
	wool	—	—	—	1	—
PRINTING						
Fixation		—	—	—	—	—
Dischargeability		—	—	—	—	—
FASTNESS						
Test Methods		ISO	AATCC	ISO	ISO AATCC	ISO
Dry Heat	conditions	mild	I	intermediate	inter. I	mild
	change	5	5	4-5	4-5 —	4-5
	staining	5	5	4-5	4-5 4-5	5
Light	source	daylight	Carbon arc	daylight	daylight C. arc	daylight
	pale	6	4	4-5	5 4	5-6
	medium	6	3-4	4-5	5 4-5	5-6
	heavy	6-7	—	4-5	5-6 5	5-6
Nitrogen Oxides		5	—	5	5 —	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline alkaline	alkaline
	change	4-5	5	4-5	4-5 5	5
	staining	3-4	4	4	4-5 5	5
Pleating (steam)	conditions	mild	—	severe	severe —	severe
	change	5	—	4-5	4-5 —	4-5
	staining	5	—	4	4 —	4
Washing	conditions	ISO 1	II	ISO 3	ISO 4 III	ISO 3
	change	5	3-4	4-5	5 5	4-5
	staining	4-5	2-3	4-5	4-5 5	5
OTHER USES						
Textile						
Non-Textile						
NOTES						

104			105	C.I. Disperse Red
Anthraquinone			Monoazo	CHEMICAL CLASS
ACETATE	TRIACETATE	POLYESTER	NYLON	C.I. CONSTITUTION NO.
Bluish Red yellower	Bluish Red yellower	Bright Bluish Red yellower	Bright Yellowish Red yellower, brighter	SUBSTRATE
				HUE Artificial Light (tungsten)
N	N	Nc, HT	N (95-98°C)	DYEING Methods
—	—	—	—	Dyeing Properties
—	—	—	—	Rate
—	—	—	—	Temp. range
—	—	—	—	Levelling
—	—	—	—	Build-up
—	—	—	—	Reservation
—	—	—	—	cotton
—	—	—	—	viscose
—	—	—	—	wool
—	—	—	AS	PRINTING
—	—	—	✓	Fixation
				Dischargeability
AATCC I — 4-5	AATCC I — 4-5	AATCC III — 3	ISO — — —	FASTNESS Test Methods
Carbon arc — 6 — —	Carbon arc — 6-7 — —	Carbon arc — 4-5 5-6 6 —	daylight — 5 5-6 5-6 —	Dry Heat conditions change staining
alkaline 4 — — —	alkaline 3-4 — — —	alkaline 5 — — —	alkaline — 4-5 2-3 — — —	Light source pale medium heavy
II 3 —	II 4 —	III 5 —	ISO 3 3-4 2	Nitrogen Oxides
				Perspiration acid/alk. change staining
				Pleating conditions (steam) change staining
				Washing conditions change staining
				OTHER USES Textile
				Non-Textile
				NOTES

C.I. Disperse Red 106—110

C.I. Disperse Red	106		107	108
CHEMICAL CLASS	Monoazo		Monoazo	Monoazo
C.I. CONSTITUTION NO.	—		—	—
SUBSTRATE	TRIACETATE	POLYESTER	NYLON	NYLON
HUE	Yellowish Red	Yellowish Red	Bright Bluish Red	Bright Bluish Red
Artificial Light (tungsten)	brighter	little brighter	yellower	yellower
DYEING				
Methods	N, Nc, HT	Nc, HT	N (95–98°C)	N (95–98°C)
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	—	—	—	—
Reservation				
cotton	5	5	—	—
viscose	5	5	—	—
wool	3	3	—	—
PRINTING				
Fixation	PS, T	PS, T	AS	AS
Dischargeability	—	—	✓	✓
FASTNESS				
Test Methods				
Dry Heat	ISO intermediate	ISO intermediate	ISO	ISO
conditions	5	5	—	—
change	4–5	4–5	—	—
staining				
Light	daylight	daylight	daylight	daylight
source	—	5–6	5	4–5
pale	6	5–6	5	5
medium	—	6–7	5	5–6
heavy				
Nitrogen Oxides	4–5	—	—	—
Perspiration	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	4–5	4–5
change	4–5	4–5	4	4
staining				
Pleating	—	—	severe	severe
(steam)	—	—	4	4
change	—	—	4	4
staining				
Washing	ISO 3	ISO 3	ISO 3	ISO 3
conditions	5	5	4	4
change	5	5	2	2–3
staining				
OTHER USES				
Textile				
Non-Textile				
NOTES	Should be applied from an acid bath; pH 4.5–5.5			

109					110	C.I. Disperse Red
Monoazo					Azo	CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	ACETATE	C.I. CONSTITUTION NO.
Bright Yellowish Red yellower	Bright Yellowish Red yellower	Bright Yellowish Red yellower	Bright Yellowish Red yellower	Yellowish Red yellower	Red yellower	SUBSTRATE
						HUE
						Artificial Light (tungsten)
N	N	N, (Nc)	Nc, HT	N	N	DYEING Methods
B—rapid	moderate	—	—	—	—	Dyeing Properties
B—v. good	very good	—	—	—	—	Rate
C—good	good	—	—	—	—	Temp. range
B—v. good	very good	—	—	—	—	Levelling
—	—	—	—	—	—	Build-up
4-5	4	—	—	—	—	Reservation
3	3	—	—	—	—	cotton
						viscose
						wool
AS ✓	AS ✓	PS ✓	poor yield —	AS —	AS —	PRINTING
						Fixation
						Dischargeability
ISO mild 5 5	ISO intermediate 4-5 3-4	ISO intermediate 4-5 4-5	ISO intermediate 4-5 3-4	ISO mild 5 5	AATCC — — —	FASTNESS Test Methods
daylight 5 5-6 6	daylight 4-5 5 5-6	daylight 4 4-5 4-5	daylight 4-5 5 5	daylight 5-6 6 6-7	Carbon arc — 3-4 —	Dry Heat
5	—	4-5	—	—	4-5	conditions change staining
alkaline 4-5 3	alkaline 4-5 2-3	alkaline 4-5 4	alkaline 5 5	alkaline 5 4-5	alkaline 5 3-4	Light
mild 5 5	intermediate 5 4-5	intermediate 5 4-5	severe 5 4	intermediate 5 5	— — —	source pale medium heavy
ISO1 5 4-5	ISO1 4-5 4-5	ISO3 4 4	ISO4 4-5 4	ISO2 4-5 5	I 5 4-5	Nitrogen Oxides
						Perspiration
						acid/alk. change staining
						Pleating (steam)
						conditions change staining
						Washing
						conditions change staining
					Nylon: light, 1	OTHER USES Textile
						Non-Textile
						NOTES

C.I. Disperse Red 111—118

C.I. Disperse Red	111	112	113	114	115
CHEMICAL CLASS	Azo	Azo	Azo		Disazo
C.I. CONSTITUTION NO.	—	—	—		—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER		NYLON POLYESTER
HUE	Bluish Red	Bluish Red	Red		Yellowish Red Yellowish Red
Artificial Light (tungsten)	yellower	—	brighter		brighter brighter
DYEING					
Methods	Nc, HT, T	Nc, HT, T	Nc, HT, T		N HT, T
Dyeing Properties					
Rate	—	—	—		—
Temp. range	—	—	—		—
Levelling	—	—	—		—
Build-up	—	—	—		—
Reservation					
cotton	—	—	—		—
viscose	2	—	2-3		—
wool	1	—	1		—
PRINTING					
Fixation	PS	—	PS		PS, T
Dischargeability	✓	—	✓		—
FASTNESS					
Test Methods	AATCC		AATCC		ISO
Dry Heat	III		III		—
conditions	—		—		—
change	4-5		3-4		—
staining					
Light	Carbon arc		Carbon arc		daylight
source	5-6		4-5		5
pale	6		5		6
medium	—		—		7
heavy					7-8
Nitrogen Oxides	—		—		—
Perspiration	acid/alk.		—		alkaline
change	—		—		4-5
staining	—		—		4-5
Pleating	conditions		—		—
(steam)	change		—		—
	staining		—		—
Washing	conditions		II		ISO 3
change	5		5		3-4
staining	5		5		3-4
OTHER USES					
Textile					
Non-Textile					
NOTES			Dye from acid bath; hue becomes bluer in alkali		

This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 55

116	117				118	C.I. Disperse Red
Anthraquinone — POLYESTER Bluish Pink —	Monoazo — ACETATE Bright Bluish Red yellower TRIACETATE Bright Red yellower POLYESTER Red yellower ACRYLIC Bluish Red yellower				Azo — POLYESTER Dull Yellowish Red little brighter	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT — — — — — — — — —	N — — — — — — — AS ✓	Nc, HT — — — — — — — PS ✓	HT, T — — — — — — — PS —	N — — — — — — — PS —	HT, T — — — — — — 1-2 PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	AATCC — — — Carbon arc 5 5 — 5 alkaline 5 4 — — — II 5 4	ISO inter. V 5 — 5 4-5 day. C. arc 5-6 4 5-6 5 6 — 4-5 5 alk. 5 4 5 severe 5 — 5 — ISO 3 4 3-4 5	AATCC V — — 4-5 C. arc 5 5-6 — — — alk. 5 5 5 — — — III 5 5 5	ISO — — — daylight 6-7 6-7 — — alkaline 5 4 intermediate 4-5 5 ISO 2 5 5 5	ISO — — — daylight 6-7 6-7 6 — alkaline 5 5 — — — ISO 4 4-5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Modacrylics; suitable				Printing of acetate, nylon, triacetate, acrylic	OTHER USES Textile Non-Textile
	Good fastness to durable press finishing				Suitable for durable press finishing	NOTES

C.I. Disperse Red 119—127

C.I. Disperse Red	119	120		121	122	
CHEMICAL CLASS		Monoazo		Anthraquinone	Azo	
C.I. CONSTITUTION NO.		—		—	—	
SUBSTRATE		NYLON	POLYESTER	POLYESTER	NYLON	POLYESTER
HUE		—	—	Yellowish Red	—	Bright Red
Artificial Light (tungsten)		—	—	—	—	yellower
DYEING						
Methods		N	Nc, HT	HT, T	N	(Nc), HT, T
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	—	—	—
	viscose	—	—	—	—	—
	wool	—	—	—	—	—
PRINTING						
Fixation		—	—	—	—	—
Dischargeability		—	—	—	—	—
FASTNESS		This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 17				
Test Methods						
Dry Heat	conditions					
	change					
	staining					
Light	source					
	pale					
	medium					
	heavy					
Nitrogen Oxides						
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	4-5	4-5	5	4-5	5
	staining	4-5	5	5	4-5	5
Pleating (steam)	conditions	—	—	—	—	intermediate
	change	—	—	—	—	5
	staining	—	—	—	—	5
Washing	conditions	ISO 1	ISO 3	ISO 3	ISO 1	ISO 4
	change	4	5	5	4-5	4-5
	staining	3-4	5	5	4-5	4
OTHER USES						
Textile						
Non-Textile						
NOTES					Polyester: light fastness not affected by residual phenolic carriers. Anomalous fading may occur in admixture with some anthraquinone blue dyes	

123	124	125	126	127	C.I. Disperse Red
Azo — ACETATE Bright Red —		Azo — POLYESTER Yellowish Red little brighter	Azo — POLYESTER Red yellower	Anthraquinone — POLYESTER Bluish Red little yellower	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N — — — — — — — — —	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Red 103	HT, (Nc) HT method moderate — moderate good — 4 — PS —	Nc, HT — — — — — 4 — — —	— — — — — — 4 — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
		AATCC III 5 5 Carbon arc 5-6 6-7 — — alkaline 5 5 — — — II 5 5	AATCC III — 4 Carbon arc 4 5 — — alkaline 5 5 — — — II 5 5	AATCC III — 4 Carbon arc 6 6-7 — — alkaline 5 5 — — — II 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
		Triacetate			OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Red 128—131

C.I. Disperse Red	128	129	130		
CHEMICAL CLASS	Azo	Azo	Monoazo		
C.I. CONSTITUTION NO.	—	—	—		
SUBSTRATE	POLYESTER	POLYESTER	NYLON	TRIACETATE	POLYESTER
HUE	Dull Red	Dull Reddish Orange	Bluish Red	Bluish Red	Bluish Red
Artificial Light (tungsten)	little yellower	little brighter	yellower	yellower	yellower
DYEING					
Methods	Nc, HT	Nc, HT	N	Nc, HT	HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation	—	—	—	—	—
cotton	—	—	—	—	—
viscose	4	4	—	—	—
wool	—	—	—	—	—
PRINTING					
Fixation	—	—	AS	PS	PS, T
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods	AATCC	AATCC	ISO	ISO	ISO
Dry Heat	III	III	—	severe	severe
conditions	—	—	—	4-5	4
change	4	4	—	4	4
staining					
Light	Carbon arc	Carbon arc	daylight	daylight	daylight
source	5	5-6	4-5	5-6	5-6
pale	5-6	5-6	5	6	6
medium	—	—	—	6	6
heavy					
Nitrogen Oxides	—	—	4-5	4-5	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	3-4	5	5
change	5	5	—	4	5
staining					
Pleating	—	—	—	severe	severe
(steam)	—	—	—	5	5
change	—	—	—	5	5
staining					
Washing	II	II	ISO 2	ISO 3	ISO 4
conditions	5	5	3	4-5	5
change	5	5	4	4	5
staining					
OTHER USES			Acetate, Acrylic: suitable		
Textile					
Non-Textile					
NOTES			Very similar to C.I. Disperse Red 88		

131				C.I. Disperse Red
Monoazo				CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Bright Bluish Red yellow	Bluish Pink yellow	Bluish Red yellow	Bluish Red yellow	SUBSTRATE
				HUE
				Artificial Light (tungsten)
N	N	N, Nc, HT	HT, T	DYEING
				Methods
E—very slow E—poor D—moderate C—good	at 95°C slow moderate good moderate	D—slow E—poor C—good B—very good	Nc HT — — — — — moderate poor good	Dyeing Properties
2-3 3 1	4-5 4-5 1	3-4 3-4 1	3 3 1	Rate
				Temp. range
				Levelling
				Build-up
AS	—	PS, (AS)	PS, AS _c T	Reservation
—	—	—	—	cotton
				viscose
				wool
				PRINTING
				Fixation
				Dischargeability
ISO	ISO	ISO	ISO	FASTNESS
—	intermediate	intermediate	severe	Test Methods
—	—	4-5	5	Dry Heat
—	5	5	4-5	conditions
daylight	daylight	daylight	daylight	change
5-6	4-5	4-5	5	staining
5-6	4-5	5	5-6	
—	—	—	5-6	Light
5	—	5	—	source
alkaline	alkaline	alkaline	alkaline	pale
5	5	4-5	5	medium
4-5	4	5	4-5	heavy
—	severe	intermediate	intermediate	Nitrogen Oxides
—	5	4	5	Perspiration
—	5	5	5	acid/alk.
ISO3	ISO3	ISO3	ISO4	change
4-5	4	4	5	staining
5	4-5	5	5	Pleating
				(steam)
				conditions
				change
				staining
				Washing
				conditions
				change
				staining
				OTHER USES
				Textile
				Non-Textile
				NOTES

C.I. Disperse Red 132—136

C.I. Disperse Red	132		133	134	
CHEMICAL CLASS	Anthraquinone		Anthraquinone	Monoazo	
C.I. CONSTITUTION NO.	—		—	—	
SUBSTRATE	TRIACETATE	POLYESTER	POLYESTER	TRIACETATE	POLYESTER
HUE	Bright Bluish Red	Bright Bluish Red	Bright Bluish Red	Red	Bluish Red
Artificial Light (tungsten)	yellow	yellow	yellow	yellow	yellow
DYEING					
Methods	Nc, HT	Nc, HT	T	Nc, HT	Nc, HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	—	—
PRINTING					
Fixation	PS, (AS)	PS, (ASc)	PS, T	PS, T	PS, T
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods					
Dry Heat	ISO severe 4-5 3	ISO intermediate 4-5 4	ISO severe 4 2-3	ISO severe 4 3-4	ISO severe 4-5 4
Light					
source	daylight	daylight	daylight	daylight	daylight
pale	—	6	7	—	7
medium	6	6	7-8	6-7	7
heavy	—	6	—	—	7-8
Nitrogen Oxides	2	—	—	5	—
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	5
staining	5	5	5	5	5
Pleating (steam)					
conditions	—	intermediate	—	—	—
change	—	4-5	—	—	—
staining	—	4-5	—	—	—
Washing					
conditions	ISO 3	ISO 4	ISO 4	ISO 3	ISO 4
change	5	4-5	4	5	4-5
staining	4-5	3-4	4	5	3-4
OTHER USES					
Textile	Wool/Polyester blends			Wool/Polyester blends	
Non-Textile					
NOTES					

135	136			C.I. Disperse Red
Monoazo — POLYESTER Yellowish Red brighter	Azo — ACETATE Bright Bluish Red yellower NYLON Bluish Red yellower TRIACETATE Bright Red yellower			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — — — — — — PS —	N — — — — — — — AS —	N — — — — — — — — —	N — — — — — — — PS —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC V 5 4 Carbon arc 5-6 6 6-7 5 alkaline 5 5 intermediate 5 5 III 5 5	AATCC — — — Carbon arc 4 5 — 5 alkaline 5 4 — — — II 5 3	AATCC V — 5 Carbon arc 2-3 3 — 5 alkaline — 2 — — — II 4 3	AATCC V — 5 Carbon arc 4-5 5-6 5-6 5 alkaline 5 5 — — — II 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Printing on acetate, nylon, tri- acetate	Modacrylics: suitable			OTHER USES Textile Non-Textile
Good fastness to durable press finishing				NOTES

C.I. Disperse Red 137—140

C.I. Disperse Red		137							
CHEMICAL CLASS		Monoazo							
C.I. CONSTITUTION NO.									
SUBSTRATE		ACETATE		NYLON		TRIACETATE		ACRYLIC	
HUE		Bright Bluish Red		Bright Bluish Red		Bright Red		Bluish Red	
	Artificial Light (tungsten)	yellower		yellower		yellower		yellower	
DYEING									
Methods		N		N		Nc		N	
Dyeing Properties									
Rate		C—moderate		moderate		moderate		—	
Temp. range		C—good		moderate		—		—	
Levelling		C—good		good		—		—	
Build-up		B—very good		good		good		—	
Reservation	cotton	—		—		—		—	
	viscose	3		3-4		—		—	
	wool	2		2		—		—	
PRINTING									
Fixation		AS		AS		PS, (AS)		PS	
Dischargeability		✓		✓		✓		—	
FASTNESS									
Test Methods		ISO	AATCC	ISO	AATCC	ISO	AATCC	ISO	
Dry Heat	conditions	mild	—	intermediate	V	severe	V	mild	
	change	5	—	4-5	5	5	—	4-5	
	staining	5	—	5	5	4-5	4-5	5	
Light	source	daylight	Carbon arc	daylight	Carbon arc	daylight	Carbon arc	daylight	
	pale	5-6	4-5	3-4	2-3	4	4-5	6	
	medium	6	5	4	3	4-5	5	6	
	heavy	6-7	5	4	—	5	5	6-7	
Nitrogen Oxides		4-5	5	—	5	4-5	5	—	
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline	
	change	5	5	5	—	5	5	5	
	staining	3-4	5	3-4	3-4	4	—	4-5	
Pleating (steam)	conditions	mild	—	intermediate	—	severe	—	intermediate	
	change	5	—	5	—	5	—	4	
	staining	5	—	5	—	4-5	—	5	
Washing	conditions	ISO 2	II	ISO 2	II	ISO 3	II	ISO 3	
	change	4	4-5	4	4	4	5	5	
	staining	3-4	2-3	3-4	4	3	5	5	
OTHER USES									
Textile		Polyester: not recommended							
		Modacrylics: suitable							
Non-Textile									
NOTES									

138			139	140	C.I. Disperse Red
Anthraquinone —			Monoazo —	Monoazo —	CHEMICAL CLASS
ACETATE	TRIACETATE	POLYESTER	POLYESTER	POLYESTER	C.I. CONSTITUTION NO.
Bluish Pink yellower	Bluish Pink yellower	Bright Bluish Red yellower	Red little brighter	Bluish Red yellower	SUBSTRATE
					HUE Artificial Light (tungsten)
N	N, HT, T	Nc, HT, T	HT, T (220°C)	HT, T	DYEING Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
—	—	—	—	—	Levelling
—	—	5	—	—	Build-up
—	—	5	—	—	Reservation
—	—	3-4	—	—	cotton
					viscose
					wool
AS	PS	PS	PS, T	PS, T	PRINTING
—	—	—	—	—	Fixation
					Dischargeability
AATCC — — —	AATCC V — 4-5	AATCC V — 5	AATCC V — 4	AATCC — — —	FASTNESS Test Methods
Carbon arc 6 6 —	Carbon arc 6 6 —	Carbon arc 7 6 —	Carbon arc 6 6-7 7	Carbon arc 6 6 6-7	Dry Heat
3-4	3-4	—	—	5	conditions change staining
alkaline 5 —	alkaline 5 —	alkaline 5 —	alkaline 4-5 5	alkaline 5 —	Light
—	—	—	—	—	source pale medium heavy
—	—	—	—	—	Nitrogen Oxides
—	—	—	—	—	Perspiration
II 4-5 4	II 5 4-5	III 5 5	III 4-5 5	IIIA 4-5 4-5	acid/alk. change staining
					Pleating (steam)
					conditions change staining
					Washing
					conditions change staining
Modacrylics: suitable			Triacetate: by printing	Acetate, Triacetate: by printing	OTHER USES Textile
					Non-Textile
Good fastness to durable press finishing			Good fastness to durable press fin- ishing	Excellent fastness to sublimation	NOTES

C.I. Disperse Red 141—151

C.I. Disperse Red	141	142	143	144	145
CHEMICAL CLASS	Azo	Azo	Azo	Azo	Azo
C.I. CONSTITUTION NO.	26105	—	—	—	—
SUBSTRATE	POLYPROPYLENE*	POLYPROPYLENE*	POLYESTER	POLYPROPYLENE*	POLYESTER
HUE	Pink		Red	Bluish Red	Bluish Red
Artificial Light (tungsten)	—		yellower	yellower	yellower
DYEING					
Methods	1-1½ hrs at 95-100°C		Nc, HT	1 hr at pH 5-6 and temperatures 60-100°C	Nc, HT
Dyeing Properties					
Rate	—		—	—	—
Temp. range	—		—	—	—
Levelling	—		—	—	—
Build-up	—		—	—	—
Reservation					
cotton	—		—	—	—
viscose	—		—	—	—
wool	—		—	—	—
PRINTING					
Fixation	—		—	—	—
Dischargeability	—		—	—	—
FASTNESS					
Test Methods	ISO		AATCC	ISO	AATCC
Dry Heat			III	130°C	III
conditions	—		—	4-5	—
change	—		4-5	5	4-5
staining	—				
Light					
source	daylight		Carbon arc	daylight	Carbon arc
pale	—		—	4-5	—
medium	4		6	5	6
heavy	—		—	6	—
Nitrogen Oxides	—		—	5	—
Perspiration					
acid/alk.	—		—	alkaline	—
change	—		—	4-5	—
staining	—		—	4-5	—
Pleating					
(steam)					
conditions	—		—	—	—
change	—		—	—	—
staining	—		—	—	—
Washing					
conditions	ISO 3		II	ISO 3	II
change	5		5	4-5	5
staining	5		5	4-5	5
OTHER USES					
Textile			Nylon Acetate		Nylon Acetate
Non-Textile	See C.I. Solvent Red 24				
NOTES	*Unmodified fibre Dry cleaning fast-ness: very poor	*Unmodified fibre		*Nickel modified fibre Dry cleaning fast-ness, 3-4, 4	

146	147	148	149	150	151	C.I. Disperse Red
Azo — POLYESTER Bluish Red little change	Azo — POLYESTER Bluish Red yellower	Azo — POLYESTER Red —	Azo — POLYESTER Red —	Anthraquinone — POLYESTER Pink —	Disazo — POLYESTER Bright Red yellower	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT — — — — — — — — —		HT — — — — — — — — —	HT — — — — — — — — —	HT — — — — — — — — —	(Nc), HT, T (210°C) — — — — 4-5 — 2-3 PS, T x	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC III — 3 Carbon arc — 6-7 — — — — — — — II 5 5	AATCC III — 3-4 Carbon arc — 6 — — — — — — II 5 5	AATCC III 5 5 Carbon arc 6 6-7 7 — — — — — II 5 5	AATCC III 5 5 Carbon arc 5 5-6 6 — — — — — — — II — — —	AATCC III 5 5 Carbon arc 6 6-7 6-7 — — — — — — — — — — —	ISO severe 4-5 3-4 daylight 4-5 5 5-6 5 alkaline 5 5 intermediate 5 5 ISO4 4-5 4-5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon Acetate	Acetate	Triacetate: suitable			Recommended only for polyester	OTHER USES Textile Non-Textile
					Tends to pro- duce anomalous fading with some blue anthraquinone dyes	NOTES

C.I. Disperse Red 152—158

C.I. Disperse Red	152	153	154	155	156
CHEMICAL CLASS	Azo	Azo	Azo	Monoazo	Azo
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	POLYESTER	ACETATE
HUE	Bright Red	Bright Yellow- ish Red	Bright Red	Red	Bright Red
Artificial Light (tungsten)	yellower	little brighter	yellower	—	little yellower
DYEING					
Methods	Nc, HT	Nc, HT	Nc, HT		N
Dyeing Properties		HT method	HT method		
Rate	—	moderate	moderate		moderate
Temp. range	—	—	—		good
Levelling	—	—	—		—
Build-up	—	good	good		good
Reservation					
cotton	—	4	4		4
viscose	—	4	4		4
wool	—	2	2		2
PRINTING					
Fixation	PS	PS	PS		AS
Dischargeability	✓	✓	✓		✓
FASTNESS					
Test Methods	AATCC	AATCC	AATCC		AATCC
Dry Heat					
conditions	—	—	—		—
change	—	—	—		—
staining	—	—	—		—
Light					
source	Carbon arc	Carbon arc	Carbon arc		Carbon arc
pale	5-6	5	6		3
medium	6	6	6		4
heavy	6-7	6	6		4-5
Nitrogen Oxides	—	—	—		—
Perspiration					
acid/alk.	—	—	—		—
change	—	—	—		—
staining	—	—	—		—
Pleating					
(steam)					
conditions	—	—	—		—
change	—	—	—		—
staining	—	—	—		—
Washing					
conditions	II	II	II		II
change	5	5	5		4-5
staining	5	5	5		4-5
OTHER USES					
Textile	Acetate and tri- acetate: suitable	Acetate, nylon and triacetate: suitable	Acetate, nylon and triacetate: suitable		Nylon, acrylic and triacetate: suitable
Non-Textile					
NOTES					

157	158				C.I. Disperse Red
Azo — POLYESTER Yellowish Red —	Disazo — ACETATE Yellowish Red bluer NYLON Yellowish Red little brighter TRIACETATE Yellowish Red little brighter POLYESTER Yellowish Red little bluer				CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT HT method moderate — — good 4 4 2 PS x	N E—very slow E—poor C—good C—good 4-5 4-5 2-3 AS x	N at 95°C slow moderate good moderate 4 4-5 2-3 — —	Nc, HT D—slow E—poor D—moderate B—very good 4 3-4 2 PS x	Nc, HT HT method — — moderate very good 4 4 1 PS x	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC — — — Carbon arc 6 6 6-7 — — — — — — — II 5 5	ISO — — — daylight 4-5 6 6-7 5 alkaline 5 4 — — — ISO 2 5 5	ISO intermediate 5 4 daylight 4-5 4-5 — — alkaline 5 3-4 severe 5 3-4 ISO 2 4-5 4-5	ISO intermediate 5 4 daylight 4-5 6 6 5 alkaline 5 5 severe 5 4 ISO 3 5 5	ISO intermediate 5 4 daylight 4-5 5 5 — alkaline 5 4-5 intermediate 5 5 ISO 4 4-5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
					OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Red 159—164

C.I. Disperse Red		159				
CHEMICAL CLASS		Anthraquinone				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Bluish Red	Bluish Red	Bluish Red	Bluish Red	Dull Bluish Red
Artificial Light (tungsten)		yellower	yellower	yellower	yellower	yellower
DYEING						
Methods		See notes	See notes	N, HT	Nc, HT, T*	See notes
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation						
cotton		—	—	—	—	—
viscose		—	—	—	—	—
wool		—	—	—	—	—
PRINTING						
Fixation		AS	AS	PS	PS	PS
Dischargeability		x	x	x	x	x
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat		mild	—	severe	severe	mild
conditions		—	—	4-5	4-5	4-5
change		—	—	—	3	4-5
staining		5	—	—	—	—
Light						
source		daylight	daylight	daylight	daylight	daylight
pale		—	—	6	6-7	—
medium		6	4-5	6	6	4-5
heavy		—	—	6	6	—
Nitrogen Oxides		—	—	5	5	—
Perspiration						
acid/alk.		alkaline	alkaline	alkaline	alkaline	alkaline
change		4-5	4-5	5	5	4-5
staining		5	4-5	5	5	5
Pleating						
(steam)						
conditions		—	—	severe	severe	—
change		—	—	—	4-5	—
staining		—	—	3	3-4	—
Washing						
conditions		ISO 1	ISO 3	ISO 3	ISO 4	ISO 3
change		5	3	4-5	4	2
staining		5	3	4-5	4	5
OTHER USES						
Textile						
Non-Textile						
NOTES		*Hue becomes bluer on thermofixation Acetate, Nylon, Acrylic: application primarily by printing methods				

160	161	162	163	164	C.I. Disperse Red
Azo — POLYESTER Red yellower	Disazo — POLYPROPYLENE* Red —	Anthraquinone — POLYPROPYLENE* Red —	Azo — POLYESTER Bluish Red yellower	Anthraquinone — POLYESTER Bright Bluish Red yellower	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
HT, T — — — — — — — PS —	60 min at 95–98°C	60 min at 95–98°C	T (210°C) — — — — — — —	Nc, HT — — — — — — — PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 6–7 6–7 6–7 — alkaline 5 5 — — — ISO 4 4–5 4–5	AATCC — — — Carbon arc — — 6 — — — — — 4 5	AATCC — — — Carbon arc — 4–5 — — — — — — 5 —	AATCC V — 4–5 Carbon arc 4–5 4–5 — — — — — III 4 —	AATCC — — — Carbon arc 7 6–7 6 — — — — II 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Cellulosic– polyester blends				Acetate, nylon and triacetate: suitable	OTHER USES Textile Non-Textile
	*Unmodified fibre	*Unmodified fibre	Good fastness to durable press finishing		NOTES

C.I. Disperse Red 165—172

C.I. Disperse Red	165	166			167&167:1†	168
CHEMICAL CLASS	Anthraquinone	Monoazo			Azo	Azo
C.I. CONSTITUTION NO.	—	—			—	—
SUBSTRATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	POLYESTER	POLYESTER
HUE	Bright Bluish Red	Dull Red	Dull Red	Dull Bluish Red	Bluish Red	Bluish Red
Artificial Light (tungsten)	yellower	yellower	yellower	yellower	yellower	yellower
DYEING						
Methods	HT, T	N	N	Nc, HT	HT	HT*, T
Dyeing Properties						
Rate	slow	—	—	—	—	—
Temp. range	—	—	—	—	—	—
Levelling	—	—	—	—	—	—
Build-up	—	—	—	—	—	—
Reservation						
cotton	4	4	—	—	3	—
viscose	4	4	—	—	—	—
wool	2	3	—	—	2	—
PRINTING						
Fixation	PS	AS	PS	PS	—	PS, T
Dischargeability	×	✓	✓	—	—	✓
FASTNESS						
Test Methods	AATCC	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	—	—	intermediate	—
change	—	—	—	—	5	—
staining	—	—	—	—	5	—
Light	source	Carbon arc	daylight	daylight	daylight	daylight
pale	7-8	6	6	6	6-7	6
medium	7	5-6	6	5	7-8	6
heavy	7	—	—	—	—	6
Nitrogen Oxides	—	5	5	5	5	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	—	4-5	4-5	5	5	5
staining	—	4-5	5	5	5	5
Pleating	conditions	—	severe	severe	—	—
(steam)	change	—	4	5	—	—
staining	—	—	5	5	—	—
Washing	conditions	ISO 1	ISO 3	ISO 4	ISO 3	ISO 3
change	5	5	5	5	5	5
staining	5	5	5	5	5	5
OTHER USES						
Textile					Polypropylene	Triacetate: by printing
Non-Textile						
NOTES					†Red 167:1 is similar in constitution and properties to Red 167	*pH 4.5-5.5 Good fastness to durable press finishing

169	170	171	172		C.I. Disperse Red
Monoazo —	Azo —	Azo —	Monoazo —		CHEMICAL CLASS
POLYESTER	POLYPROPYLENE*	POLYPROPYLENE*	ACETATE	TRIACETATE	C.I. CONSTITUTION NO.
Yellowish Red little yellower	Dull Bluish Red yellower	Dull Red yellower	Bright Red yellower	Bright Yellow- ish Red little change	SUBSTRATE
					HUE Artificial Light (tungsten)
T	60 min at 97–100°C	60 min at 97–100°C	N*	N*, HT	DYEING Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
—	—	—	—	—	Levelling
—	—	—	—	—	Build-up
—	—	—	—	—	Reservation
—	—	—	—	—	cotton
—	—	—	—	—	viscose
—	—	—	—	—	wool
T	—	—	AS	PS, (AS)	PRINTING
—	—	—	✓	✓	Fixation
					Dischargeability
	AATCC — — —	AATCC — — —	ISO — — —	ISO intermediate 4–5 4–5	FASTNESS Test Methods
	Carbon arc 4 — —	Carbon arc 5 — —	Xenon arc 4–5 5 5–6 4–5	Xenon arc 3–4 4 5 5	Dry Heat conditions change staining
	alkaline 4–5 4	alkaline 4–5 3	alkaline 4 2–3	alkaline 4–5 4–5	Light source pale medium heavy
	— — —	— — —	— — —	intermediate 4–5 4–5	Nitrogen Oxides
	II 5 4–5	II 3–4 4	ISO 1 4–5 4–5	ISO 3 4–5 4–5	Perspiration acid/alk. change staining
					Pleating conditions (steam) change staining
					Washing conditions change staining
Acetate, nylon, triacetate: by printing			Nylon, polyester: by printing		OTHER USES Textile
					Non-Textile
Not recommen- ded for exhaust dyeing	*Unmodified fibre	*Unmodified fibre	*Dye at pH 5–6		NOTES

C.I. Disperse Red 173—182

C.I. Disperse Red	173	174	175	176	177
CHEMICAL CLASS	Azo	Azo	Azo	Azo	Azo
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	POLYPROPYLENE*	POLYPROPYLENE*	POLYPROPYLENE*	POLYESTER	POLYESTER
HUE	Dull Red	Dull Red	Dull Bluish Red	Bluish Red	Red
Artificial Light (tungsten)	yellower	yellower	yellower	yellower	little brighter
DYEING					
Methods	1 hr at pH 5-6 and 97-100°C	1 hr at pH 5-6 and 97-100°C	1 hr at pH 5-6 and 97-100°C	HT	HT, (Nc)
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	—	—
PRINTING					
Fixation	—	—	—	—	PS
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat					
conditions	—	—	—	—	—
change	—	—	—	—	—
staining	—	—	—	—	—
Light					
source	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
pale	4-5	4-5	4-5	4	4-5
medium	6	6	6	—	—
heavy	—	—	—	—	—
Nitrogen Oxides	—	—	—	—	—
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	4-5	4-5
staining	5	5	5	—	—
Pleating					
(steam)					
conditions	—	—	—	—	—
change	—	—	—	—	—
staining	—	—	—	—	—
Washing					
conditions	III	III	III	III	III
change	5	5	5	4-5	4-5
staining	5	4-5	5	—	—
OTHER USES					
Textile					Acetate: print Triacetate: dye- ing, printing
Non-Textile					
NOTES					
	*Nickel modified fibre Good fastness to dry cleaning	*Nickel modified fibre Good fastness to dry cleaning	*Nickel modified fibre		

178	179	180	181	182	C.I. Disperse Red
Anthraquinone — POLYESTER Pink yellower	Azo — POLYESTER Reddish Violet yellower	Azo — POLYESTER Red yellower	Azo — POLYESTER Red yellower	Monoazo — POLYESTER Dull Red little change	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc. (HT), (T) — — — — — — — not suitable —	Nc, HT — — — — — — — PS —	Nc, HT, T — — — — — — — PS —	HT, (Nc) Nc HT — — — — — — poor good — — —	Nc,* (HT) — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC III — 4 Carbon arc 4-5 4-5 5 — alkaline 4-5 — — — III 5 5	AATCC IV — 4-5 Carbon arc 4 — — — alkaline 4-5 — — — III 4 —	AATCC IV — 5 Carbon arc 4-5 — — — alkaline 4-5 — — — III 4-5 —	AATCC III 5 4-5 Carbon arc 5-6 5-6 6 — alkaline 5 5 — — —	ISO intermediate 4-5 3 daylight 4-5 5-6 5-6 — alkaline 5 5 intermediate 5 5 ISO4 4-5 3-4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon and poly- propylene: suitable	Acetate and tri- acetate: suitable	Acetate and tri- acetate: by print- ing			OTHER USES Textile Non-Textile
Sensitive to metal ions, and to alkali in the dye bath				*Light fastness almost unaffected by residual phenolic carrier	NOTES

C.I. Disperse Red 183—192

C.I. Disperse Red	183		184		185	186
CHEMICAL CLASS	Azo		Azo		Xanthene	Monoazo
C.I. CONSTITUTION NO.	—		—		—	—
SUBSTRATE	TRIACETATE	POLYESTER	TRIACETATE	POLYESTER	POLYESTER	ACETATE
HUE	Yellowish Red	Red	Bluish Red	Dull Bluish Red	Bright Bluish Red	Dull Yellowish Red
Artificial Light (tungsten)	little brighter	little change	yellower	yellower	yellower	—
DYEING	Nc, HT, T		Nc, HT, T		Nc, HT, T	
Methods	Nc, HT, T		Nc, HT, T		Nc, HT, T	
Dyeing Properties	HT method	HT method	HT method	HT method	—	—
Rate	—	—	—	—	—	—
Temp. range	—	—	—	—	—	poor
Levelling	moderate	good	very good	moderate	—	—
Build-up	—	—	—	—	—	good
Reservation	4	4	4	4	—	4
cotton	—	—	—	—	—	4
viscose	3	3	2	2	—	2-3
wool	—	—	—	—	—	—
PRINTING	—		PS, T		—	
Fixation	—		PS, T		—	
Dischargeability	✓		✓		—	
FASTNESS	ISO		ISO		ISO	
Test Methods	intermediate		intermediate		intermediate	
Dry Heat	conditions	conditions	conditions	conditions	conditions	AATCC
change	4-5	4-5	4-5	4-5	severe	—
staining	5	4-5	5	5	5	—
Light	daylight	daylight	Xenon arc	Xenon arc	daylight	Carbon arc
source	5	5	6	7	4	—
pale	6	5-6	6-7	7	4-5	6
medium	7	6	7	7	5	—
heavy	—	—	—	—	5	—
Nitrogen Oxides	—	—	—	—	5	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	4-5	4-5	5	5
change	5	5	4-5	5	5	5
staining	—	—	—	—	—	—
Pleating	intermediate	intermediate	intermediate	intermediate	severe	—
(steam)	4-5	4-5	4-5	4-5	5	—
change	5	5	5	5	5	—
staining	—	—	—	—	—	—
Washing	ISO3	ISO4	ISO3	ISO4	ISO4	II
conditions	4-5	4-5	4-5	4-5	5	4
change	5	4	4-5	4-5	5	4-5
staining	—	—	—	—	—	—
OTHER USES					Recommended only for polyester	
Textile					Nylon and triacetate: suitable	
Non-Textile						
NOTES						

187	188	189	190	191	192	C.I. Disperse Red
Monoazo — POLYESTER Yellowish Red —	Monoazo — POLYESTER Bordeaux —	Anthraquinone — POLYESTER Bluish Red yellower	Anthraquinone — POLYESTER Bright Bluish Red —	Anthraquinone — POLYESTER Bright Bluish Red yellower	Anthraquinone — POLYESTER Bluish Red yellower	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
T (195–205°C) — — — — 4 — — — —	Nc, HT, T — — — — — — — PS —	Nc, HT, T — — — — — — — PS —	Nc, HT, T — — — — — — — PS —	Nc, HT, T — — — — — — — PS ×	Nc, HT, T — — — — — — — PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC — — Carbon arc — 4–5 — — alkaline 5 5 — — — — — — —	AATCC — — Carbon arc 7 7 — — alkaline 5 5 — — — — III 5 5	AATCC — — Carbon arc 6–7 6–7 — — alkaline 5 5 — — — — III 5 5	AATCC — — Carbon arc 7 7 — — alkaline 5 5 — — — — III 5 5	AATCC — — Carbon arc 6–7 7 — — alkaline 5 5 — — — — III 5 5	AATCC — — Carbon arc 7 7–8 — — alkaline 5 5 — — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Acetate and tri- acetate: suit- able	Triacetate: suitable	Acetate and tri- acetate: suit- able		Triacetate: suitable	OTHER USES Textile Non-Textile
						NOTES

C.I. Disperse Red 193—195

C.I. Disperse Red	193	194	195	
CHEMICAL CLASS	Azo	Azo	Azo	
C.I. CONSTITUTION NO.	—	—	—	
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	
HUE	Red	Bright Yellowish Red	Bluish Red	
Artificial Light (tungsten)	—	—	—	
DYEING				
Methods	Nc, HT, T	Nc, HT, T	Nc, HT, T	
Dyeing Properties				
Rate	—	—	—	
Temp. range	—	—	—	
Levelling	—	—	—	
Build-up	—	—	—	
Reservation				
cotton	—	—	—	
viscose	—	—	—	
wool	—	—	—	
PRINTING				
Fixation	—	—	—	
Dischargeability	—	—	—	
FASTNESS				
Test Methods	AATCC	AATCC	AATCC	
Dry Heat	V	V	V	
conditions	—	4	—	
change	5	4	5	
staining				
Light	Carbon arc	Carbon arc	Carbon arc	
source	—	—	—	
pale	6	5	6	
medium	—	—	—	
heavy				
Nitrogen Oxides	5	5	5	
Perspiration	acid/alk.	alkaline	alkaline	
change	5	5	5	
staining	4-5	5	5	
Pleating	conditions	—	—	
(steam)	change	—	—	
	staining	—	—	
Washing	conditions	IVA	IVA	
change	—	4	—	
staining	4	4	3-4	
OTHER USES				
Textile				
Non-Textile				
NOTES				

C.I. Disperse Violet 1

C.I. Disperse Violet		1					
CHEMICAL CLASS		Anthraquinone					
C.I. CONSTITUTION NO.		61100					
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	
HUE		Bright Violet	Bright Bluish Violet	Bright Violet	Violet	Bright Violet	
Artificial Light (tungsten)		much redder	redder	much redder	much redder	much redder	
DYEING		N	N	N	Nc, HT	N	
Methods							
Dyeing Properties							
Rate		A—very rapid	rapid	B—rapid	rapid	rapid	
Temp. range		C—good	very good	B—very good	good	good	
Levelling		B—very good	very good	B—very good	very good	very good	
Build-up		B—very good	very good	B—very good	very good	good	
Reservation		3-4	4-5	3-4	3	—	
cotton		4	4-5	4	3	3	
viscose		2-3	3	2-3	1	4	
wool							
PRINTING		see notes	see notes	see notes	see notes	see notes	
Fixation		×	×	×	×	×	
Dischargeability							
FASTNESS		ISO	AATCC	ISO	AATCC	ISO	ISO
Test Methods							
Dry Heat		conditions	—	inter.	—	intermediate	mild
change		—	—	3-4	5	4	4
staining		—	—	2-3	4-5	2	4
Light		source	day.	day.	day.	daylight	daylight
pale		4-5	5	4	5	5	6
medium		5-6	5	4-5	5	5-6	6-7
heavy		6	6	5	6	5-6	6-7
Nitrogen Oxides		2-3	—	4	—	—	—
Perspiration		alk.	alk.	alk.	—	alkaline	alkaline
acid/alk.		4	2	4-5	4	5	5
change		2-3	2	3	—	5	5
staining							
Pleating		—	—	inter.	—	intermediate	intermediate
(steam)		—	—	4-5	—	4-5	4-5
change		—	—	3-4	—	3-4	3
staining							
Washing		ISO1	III	ISO2	—	ISO4	ISO3
conditions		4	1	4	—	4-5	4-5
change		3-4	1	2-3	—	5	5
staining							
OTHER USES		PVC fibres: not recommended					
Textile							
Non-Textile		Wool Sheepskins and Furs					
		Plastics: surface dyeing of thermoplastics					
		Solvent dye: suitable when in pure state. <i>see</i> C.I. Solvent Violet 11					
NOTES		Printing: little used for printing due to a tendency to sublime on steaming					
		Crease resist finishing: poor fastness					
		*For details of Tests <i>see</i> <i>Colour Index</i> , 2nd Edition, 1956					

C.I. Disperse Violet 2—7

C.I. Disperse Violet	2	3	4 and 4:1			
CHEMICAL CLASS	Monoazo	Monoazo	Anthraquinone			
C.I. CONSTITUTION NO.	—	—	61105 (4:1 is similar)			
SUBSTRATE	ACETATE	ACETATE	ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE	Reddish Violet much redder	Reddish Violet redder	Bright Reddish Blue redder	Reddish Blue redder	Bright Bluish Violet redder	Reddish Blue redder
Artificial Light (tungsten)						
DYEING						
Methods	N	N	N	N	N	N
Dyeing Properties						
Rate	—	—	B—rapid	rapid	B—rapid	rapid
Temp. range	very good	very good	A—excellent	very good	C—good	good
Levelling	good	very good	B—very good	very good	B—very good	very good
Build-up	good	good	B—very good	very good	B—very good	good
Reservation	4	4	2-3	4	4	—
cotton	—	—	3-4	4	3-4	3
viscose	3-4	3-4	2	2-3	2-3	4
wool						
PRINTING						
Fixation	AS	AS	AS	AS	PS	PS
Dischargeability	✓	✓	×	×	×	×
FASTNESS						
Test Methods	ISO	ISO	ISO AATCC	ISO A*	ISO	ISO
Dry Heat	—	—	—	inter.	intermediate	mild
conditions	—	—	—	4	5	4
change	—	—	—	2	3	4-5
staining						
Light	daylight	daylight	day. C.arc	day. —	daylight	daylight
source	3-4	2-3	3-4	4	3-4	5-6
pale	4-5	3-4	4-5	4-5	4	5-6
medium	5	4	5	5	4-5	6
heavy						
Nitrogen Oxides	3-4	5	2 2	4-5 —	2	—
Perspiration	alkaline	alkaline	alk. —	— —	alkaline	alkaline
acid/alk.	4	4	4 5	4-5 4	4-5	4-5
change	3	3	2-3 3	2-3 —	3-4	5
staining						
Pleating	—	—	— —	inter. —	intermediate	intermediate
(steam)	—	—	— —	4-5 —	5	4-5
change	—	—	— —	2-3 —	3	3-4
staining						
Washing	ISO1	ISO1	ISO2 I	ISO2 —	ISO2	ISO2
conditions	4	4	3-4 4-5	3-4 2	4-5	4-5
change	4	4	3 4	3-4 —	4	5
staining						
OTHER USES						
Textile	Nylon	Nylon	Polyester: (ISO); light, 2-3, 3, 3-4; dry heat (inter.), 4, 2 PVC fibres: suitable			
Non-Textile			Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics See C.I. Solvent Violet 12			
NOTES	Good fast- ness to sublimation in steaming	Good fast- ness to sublimation in steaming	*For details of Tests see <i>Colour Index</i> , 2nd Edition, 1956 Literature: <i>Vickerstaff</i> , 273, 368, 371			

5	6		7	C.I. Disperse Violet
Azo — ACETATE Reddish Violet redder	Anthraquinone 61140 ACETATE Reddish Violet yellower		Azo 11410 ACETATE Bluish Violet redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N moderate — good good 5 5 2 AS ✓	N B—rapid C—good C—good B—very good — 5 3-4 AS x	N — — — — — — — — —	N moderate very good good very good 4 4 2 AS ✓	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 4 4-5 5 5 alkaline 4 4 — — — — — — — ISO2 4 4	ISO — — — daylight 5-6 6-7 6-7 2-3 alkaline 5 3-4 — — — — ISO2 4 4	A* — — — — — — 1 — — — — II 5 5	C* — — — daylight 4 4 4-5 4 — 4 — — — — — — 3-4 —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
	Polyester: (AATCC) light (C.arc), 5-6; dry heat (III), 4, 4		Nylon: light, 4, 4, 4-5 PVC fibres Woolskins and Furs	OTHER USES Textile Non-Textile
	Crease-resist finishing: poor fastness *For details of Tests see <i>Colour Index</i> , 2nd Edition, 1956		*For details of Tests see <i>Colour Index</i> , 2nd Edn, 1956	NOTES

C.I. Disperse Violet 8—11

C.I. Disperse Violet		8									
CHEMICAL CLASS		Anthraquinone									
C.I. CONSTITUTION NO.		62030									
SUBSTRATE		ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC	
HUE		Bright Bluish Violet redder		Reddish Blue redder		Bright Bluish Violet much redder		Bluish Violet redder		Bluish Violet redder	
Artificial Light (tungsten)											
DYEING		N		N		N, HT		Nc, HT		N	
Methods											
Dyeing Properties											
Rate		D—slow		rapid		D—slow		moderate		slow	
Temp. range		D—moderate		moderate		D—moderate		good		moderate	
Levelling		B—very good		very good		B—very good		good		good	
Build-up		B—very good		very good		B—very good		good		moderate	
Reservation		3		4-5		3		3		—	
cotton		4		4-5		3-4		3-4		4	
viscose		2-3		2-3		2-3		1-2		2	
wool											
PRINTING		AS		AS		PS, (AS)		PS, (ASc)		PS	
Fixation		x		x		x		x		x	
Dischargeability											
FASTNESS		ISO AATCC		ISO AATCC		ISO		ISO AATCC		ISO AATCC	
Test Methods		mild —		inter. —		intermediate		inter. —		mild —	
Dry Heat		5 —		4-5 —		5		4-5 —		4-5 —	
conditions		4-5 —		4 —		4-5		3-4 —		5 —	
change											
staining											
Light		daylight C.arc		daylight C.arc		daylight		daylight C.arc		daylight C.arc	
source		5 —		4-5 3		4-5		6 5		5-6 —	
pale		6 6		5-6 3-4		5		6 4		6 6-7	
medium		6-7 —		6 —		6		5-6 —		6-7 —	
heavy											
Nitrogen Oxides		3 1-2		4-5 —		2-3		5 —		5 —	
Perspiration		alkaline alkaline		alkaline alkaline		alkaline		alkaline —		alkaline —	
acid/alk.		4 4-5		4-5 4-5		4-5		5 —		5 —	
change		2-3 2		3 3		4		5 —		5 —	
staining											
Pleating		mild —		inter. —		intermediate		inter. —		inter. —	
(steam)		5 —		4-5 —		5		5 —		4-5 —	
change		5 —		4 —		4-5		4-5 —		4-5 —	
staining											
Washing		ISO2 I		ISO2 II		ISO3		ISO4 III		ISO3 II	
conditions		3-4 4		4 3-4		4		4-5 3		4-5 5	
change		3 2-3		3 3-4		4-5		4-5 5		5 5	
staining											
OTHER USES											
Textile											
Non-Textile		Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics As solvent dye for oils, fats and waxes: suitable in pure state									
NOTES		Crease-resist finishing: fastness poor									

9	10			11	C.I. Disperse Violet
Azo — ACETATE Bluish Violet redder	Monoazo — ACETATE TRIACETATE POLYESTER Reddish Violet Reddish Violet Reddish Violet redder redder redder			Anthraquinone — ACETATE Bright Reddish Violet redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N moderate — good good 5 5 2 AS ✓	N slow moderate good moderate 5 5 2 AS ✓	N, HT — — — — — — — PS —	Nc, HT, T — — — — — — — PS —	N rapid moderate good good 4 4 1-2 AS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 3-4 4 4-5 5 alkaline 4-5 4-5 — — — — — — —	ISO — — — daylight 4-5 5-6 6 4-5 alkaline 4 3-4 — — — ISO2 3-4 4-5	ISO intermediate 4-5 4-5 daylight 4-5 5-6 6 4-5 alkaline 4-5 4 — — — ISO3 4-5 5	ISO intermediate 4-5 4 daylight 7 6-7 — — alkaline 4-5 4-5 — — — ISO3 4-5 5	A* — — — — — 5 — 1 — 4-5 — — — — — 3-4 —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
Nylon	Nylon: (ISO) light 3; washing (2), 4-5, 4-5 PVC fibres: suitable Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics			Nylon: (AATCC) light 3-4, persp., 2-3 Plastics	OTHER USES Textile Non-Textile
				*For details of Tests see <i>Colour Index</i> , 2nd Edn., 1956	NOTES

C.I. Disperse Violet 12—14

C.I. Disperse Violet	12			13
CHEMICAL CLASS	Monoazo			Monoazo
C.I. CONSTITUTION NO.	11120			11195
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER	ACETATE
HUE	Reddish Violet	Reddish Violet	Violet	Bright Violet
Artificial Light (tungsten)	redder	redder	redder	redder
DYEING				
Methods	N	N	Nc, HT, T	N
Dyeing Properties				
Rate	B—rapid	B—rapid	rapid	moderate
Temp. range	C—good	C—good	good	good
Levelling	B—very good	B—very good	very good	good
Build-up	B—very good	B—very good	very good	good
Reservation				
cotton	—	—	—	4-5
viscose	5	4-5	4-5	4-5
wool	3	3	2-3	3
PRINTING				
Fixation	AS	PS, (AS)	—	AS
Dischargeability	✓	✓	—	✓
FASTNESS				
Test Methods				
Dry Heat	ISO	ISO	ISO	C* A*
conditions	mild	intermediate	intermediate	— —
change	5	4-5	4-5	— —
staining	5	4-5	4-5	— —
Light	daylight	daylight	daylight	daylight
source	2-3	2-3	4-5	3 —
pale	3-4	3-4	5	4 3
medium	4	4	5	4-5 —
heavy				
Nitrogen Oxides	4-5	5	5	3-4 1
Perspiration	acid/alk.	alkaline	alkaline	— —
change	4	4-5	5	4 3
staining	3	3-4	4-5	— —
Pleating	conditions	intermediate	intermediate	— —
(steam)	change	5	5	— —
	staining	5	5	— —
Washing	conditions	ISO3	ISO4	— II
change	ISO2	4-5	4-5	3-4 3
staining	4	5	4-5	— —
OTHER USES				
Textile	Nylon: (ISO) light, 1-2, 2, 2 PVC fibres: suitable			Nylon: (A*) light, 2-3, wash (II), 3
Non-Textile	Wool Sheepskins and Furs Plastics: surface dyeing thermoplastics			
NOTES	Dye at pH 5.5-6.0 to avoid possible hydrolysis			*For details of Tests see <i>Colour Index</i> , 2nd Ed, 1956

14					C.I. Disperse Violet
Anthraquinone					CHEMICAL CLASS
					C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	SUBSTRATE
Bright Violet	Bluish Violet	Violet	Dull Bluish Violet	Dull Bluish Violet	HUE
little change	duller	little bluer	little change	little change	Artificial Light (tungsten)
N	printing only	N	Nc, HT	N	DYEING Methods
D—slow	—	D—slow	HT method	—	Dyeing Properties
D—moderate	—	C—good	—	—	Rate
C—good	—	B—very good	moderate	—	Temp. range
B—very good	—	B—very good	good	—	Levelling
2-3	—	3	3	—	Build-up
2-3	—	3	3	—	Reservation cotton
1	—	2	1	—	viscose
AS	AS	PS, (AS)	PS	—	wool
x	x	x	x	x	PRINTING
					Fixation
					Dischargeability
ISO	ISO	ISO	ISO	ISO	FASTNESS
—	—	intermediate	intermediate	—	Test Methods
—	—	5	4-5	—	Dry Heat
—	—	4-5	4	—	conditions
daylight	daylight	daylight	daylight	daylight	change
2-3	3-4	4	4-5	6	staining
3-4	4	5	5	6	Light
4	—	6	5	—	source
3-4	5	4	—	—	pale
alkaline	alkaline	alkaline	alkaline	alkaline	medium
4	4	5	5	5	heavy
2	2	4	5	5	Nitrogen Oxides
—	intermediate	severe	intermediate	intermediate	Perspiration
—	4	5	4-5	5	acid/alk.
—	4	3-4	4-5	4-5	change
ISO1	ISO2	ISO3	ISO4	ISO2	staining
5	3	4-5	5	5	Pleating
3-4	3	4-5	4	5	(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Violet 15—22

C.I. Disperse Violet	15			16	17	18
CHEMICAL CLASS	Anthraquinone			Disazo	Anthraquinone	
C.I. CONSTITUTION NO.	—			—	—	
SUBSTRATE	ACETATE	NYLON	ACRYLIC	POLYESTER	POLYESTER	
HUE	Bright Bluish Violet redder	Bright Bluish Violet redder	Bright Reddish Blue redder	Bright Reddish Violet redder	Bluish Pink→ Reddish Violet yellow	
Artificial Light (tungsten)						
DYEING						
Methods	N	N	N	HT*, T	Nc, HT	
Dyeing Properties						
Rate	—	—	—	—	moderate	
Temp. range	—	—	—	—	—	
Levelling	—	—	—	—	—	
Build-up	—	—	—	—	—	
Reservation						
cotton	—	—	—	—	5	
viscose	—	—	—	—	5	
wool	—	—	—	—	3-4	
PRINTING						
Fixation	AS	PS	—	PS, T	PS	
Dischargeability	x	x	x		x	
FASTNESS						
Test Methods	ISO	ISO	ISO	ISO	AATCC	
Dry Heat	conditions	—	intermediate	—	—	
change	—	—	3	—	—	
staining	—	—	3	—	—	
Light	source	daylight	daylight	daylight	Carbon arc	
pale	4	—	5-6	6	—	
medium	4-5	6	6	6-7	6-7	
heavy	5-6	—	6-7	7	—	
Nitrogen Oxides	2	—	—	—	4	
Perspiration	acid/alk.	alkaline	alkaline	—	alkaline	
change	4	4	5	—	4-5	
staining	2	2	5	—	5	
Pleating	conditions	—	—	—	—	
(steam)	change	—	—	—	—	
staining	—	—	—	—	—	
Washing	conditions	ISO1	ISO3	ISO4	III	
change	4	4-5	4-5	5	4-5	
staining	4	3	5	5	5	
OTHER USES						
Textile	Triacetate: (ISO) light 5; persp., 4-5, 3-4; wash- ing (2), 4-5, 3-4				Acetate Triacetate	
Non-Textile	Wool Sheepskins and Furs Plastics: surface dyeing thermoplastics					
NOTES				*Maximum yield obtained at 140°C Literature: FP 1187253		

This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Violet 28

This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Violet 8

19	20		21		22	C.I. Disperse Violet
	—		—		Anthraquinone	CHEMICAL CLASS
	ACETATE	NYLON	ACETATE	NYLON	POLYESTER	C.I. CONSTITUTION NO.
	Violet	Violet	Bluish Violet	Bluish Violet	Bluish Violet	SUBSTRATE
	redder	redder	redder	redder	—	HUE
						Artificial Light (tungsten)
	N	N	N	N	Nc, HT	DYEING
	—	—	—	—	moderate	Methods
	—	90–95°C	—	90–95°C	—	Dyeing Properties
	—	—	—	—	—	Rate
	—	—	—	—	—	Temp. range
	5	—	—	—	4	Levelling
	—	—	—	—	2	Build-up
	—	—	—	—	PS, (ASc)	Reservation
	—	—	—	—	x	cotton
						viscose
						wool
						PRINTING
						Fixation
						Dischargeability
	AATCC	AATCC	AATCC	AATCC	AATCC	FASTNESS
	—	I	—	I	—	Test Methods
	—	4	—	4	—	Dry Heat
	—	4–5	—	4–5	—	conditions
	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	change
	6	6	6	4	6	staining
	6	6	6	4	6	
	—	—	—	—	—	Light
	—	—	—	—	4	source
	alkaline	alkaline	alkaline	alkaline	—	pale
	5	5	5	5	—	medium
	5	5	5	4–5	—	heavy
	—	—	—	—	—	Nitrogen Oxides
	—	—	—	—	—	Perspiration
	—	—	—	—	—	acid/alk.
	II	III	II	III	III	change
	4–5	4–5	4–5	5	4–5	staining
	4–5	3–4	5	4–5	5	
						Pleating
						(steam)
						conditions
						change
						staining
						Washing
						conditions
						change
						staining
						OTHER USES
					Triacetate	Textile
					Acrylic	
						Non-Textile
						NOTES
	Of interest mainly for pale to medium depths		Of interest mainly for pale to medium depths		Excellent fastness to sublimation	

C.I. Disperse Violet 23—29

C.I. Disperse Violet	23	24	25			26
CHEMICAL CLASS	Anthraquinone	Monoazo	Anthraquinone			Anthraquinone
C.I. CONSTITUTION NO.	—	11200	—			—
SUBSTRATE	POLYESTER	ACETATE	ACETATE	TRIACETATE	POLYESTER	POLYESTER
HUE	Bluish Violet	Bluish Violet	Reddish Blue	Bluish Violet	Reddish Blue	Bright Reddish Violet
Artificial Light (tungsten)	redder	redder	redder	much redder	redder	redder
DYEING						
Methods	Nc, HT	N	N	N, HT	Nc, HT	Nc, HT
Dyeing Properties						
Rate	—	—	—	—	—	—
Temp. range	—	moderate	—	—	—	—
Levelling	—	—	—	—	—	—
Build-up	—	—	—	—	—	—
Reservation	cotton	—	4	4	3-4	—
	viscose	—	—	—	—	—
	wool	—	3	3	2	—
PRINTING						
Fixation	PS	AS	AS	PS	PS	PS
Dischargeability	×	✓	×	×	×	×
FASTNESS						
Test Methods	ISO	AATCC	ISO	AATCC	ISO	AATCC
Dry Heat	conditions	—	—	—	inter. III	inter. —
change	4-5	—	—	—	5	4-5
staining	3-4	—	—	—	4-5	—
Light	source	Carbon arc	day. C.arc	day. C.arc	day. C.arc	day. C.arc
pale	daylight	—	5-6 5	5 5	6 4-5	Carbon arc
medium	6-7	3-4	7 6	7 7	6-7 5	—
heavy	7-8	—	7-8 7	7-8 7-8	7-8 6	5
Nitrogen Oxides	5	4-5	2-3 —	3 —	5 —	4
Perspiration	acid/alk.	alkaline	alk. —	alk. —	alk. —	alkaline
change	5	4-5	5 —	5 —	5 —	5
staining	5	3-4	3 —	3 —	5 —	5
Pleating	conditions	intermediate	—	—	inter. inter.	—
(steam)	change	—	—	—	5 —	—
staining	4	—	—	—	1-2 4-5	—
Washing	conditions	ISO4	ISO1 III	ISO3 III	ISO4 III	IIIA
change	5	I	4 2	5 4-5	5 5	4-5
staining	4	4	4-5 1	3-4 2-3	3-4 5	—
OTHER USES						
Textile		Nylon:	Nylon: (ISO) light, 4-5, 5, 5; persp. 5, 3-4			
Non-Textile		(AATCC) light, 1				
NOTES						Very similar to C.I. Disperse Violet 31

27		28	29			C.I. Disperse Violet
Anthraquinone		Anthraquinone 61102	Anthraquinone			CHEMICAL CLASS
ACETATE	POLYESTER	POLYESTER	ACETATE	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Reddish Violet redder	Bluish Violet redder	Bluish Violet redder	Violet redder	Violet redder	Bluish Violet redder	SUBSTRATE
						HUE
						Artificial Light (tungsten)
N	Nc, HT	Nc, HT	N	N, HT	Nc, HT	DYEING
						Methods
—	—	—	—	—	—	Dyeing Properties
—	—	—	—	—	—	Rate
—	—	—	—	—	—	Temp. range
—	—	—	—	—	—	Levelling
—	—	—	—	—	—	Build-up
—	4	4	4	4	—	Reservation
—	4	4	—	—	—	cotton
—	3	2	2-3	2-3	—	viscose
						wool
AS	PS	PS	AS	PS	PS	PRINTING
×	×	×	×	×	×	Fixation
						Dischargeability
ISO	AATCC	ISO	ISO	ISO	ISO	FASTNESS
—	III	inter.	—	inter.	—	Test Methods
—	—	4	—	5	—	Dry Heat
—	2-3	2-3	—	4-5	—	conditions
daylight	Carbon arc	day.	day.	day.	day.	change
6-7	5-6	7	5-6	4-5	6	staining
6-7	6	7	6	5-6	6	Light
6-7	6-7	7	6-7	6	6	source
5	4-5	—	3	3	—	pale
—	alkaline	alk.	alk.	alk.	alk.	medium
—	5	5	5	5	5	heavy
—	5	5	2-3	4	4-5	Nitrogen Oxides
—	—	—	—	—	—	Perspiration
—	—	—	—	inter.	severe	acid/alk.
—	—	—	—	5	4	change
—	—	—	—	2	3	staining
ISO1	IIIA	ISO4	ISO1	ISO3	ISO3	Pleating
4	3-4	5	5	5	5	(steam)
4-5	5	4	5	4-5	5	conditions
			1	2-3	5	change
						staining
Nylon: light fastness, poor		Acetate: by printing				OTHER USES
Wool Sheepskins and Furs						Textile
Plastics: surface dyeing						Non-Textile
						NOTES

C.I. Disperse Violet 30—34

C.I. Disperse Violet	30	31		32
CHEMICAL CLASS		Anthraquinone		
C.I. CONSTITUTION NO.		—		
SUBSTRATE		TRIACETATE	POLYESTER	
HUE		Bright Reddish Violet	Bright Reddish Violet	
Artificial Light (tungsten)		redder	redder	
DYEING				
Methods		N	Nc, HT	
Dyeing Properties				
Rate		—	—	
Temp. range		—	—	
Levelling		—	—	
Build-up		—	—	
Reservation				
cotton		3-4	3-4	
viscose		4	4	
wool		2	2	
PRINTING				
Fixation		—	PS	
Dischargeability		—	X	
	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Violet 27			This C.I. Generic Name is discontinued
FASTNESS				
Test Methods		ISO	ISO	
Dry Heat	conditions	severe	severe	
change		5	4	
staining		4	3	
Light	source	daylight	daylight	
pale		4-5	6	
medium		5	6	
heavy		6	6-7	
Nitrogen Oxides		4	—	
Perspiration	acid/alk.	alkaline	alkaline	
change		5	5	
staining		5	5	
Pleating (steam)	conditions	severe	severe	
change		5	5	
staining		4-5	4-5	
Washing	conditions	ISO3	ISO4	
change		5	4-5	
staining		5	4-5	
OTHER USES				
Textile		Acetate, Nylon: not recommended		
Non-Textile				
NOTES		Very similar to C.I. Disperse Violet 26		

33			34	C.I. Disperse Violet
Monoazo			Anthraquinone	CHEMICAL CLASS
—			—	C.I. CONSTITUTION NO.
ACETATE	TRIACETATE	POLYESTER	POLYESTER	SUBSTRATE
—	—	—	Bright Reddish Violet	HUE
—	—	—	redder	Artificial Light (tungsten)
N	Nc, HT	Nc, HT, T	T*	DYEING
				Methods
D—slow	D—slow	HT methods		Dyeing Properties
E—poor	E—poor	—	—	Rate
D—moderate	C—good	—	200–220°C	Temp. range
D—moderate	C—good	good	—	Levelling
		good	—	Build-up
4	3–4	4	4	Reservation
4	4	4	—	cotton
2	2	1	—	viscose
				wool
AS	—	PS	—	PRINTING
✓	—	X	—	Fixation
				Dischargeability
ISO	ISO	ISO	ISO	FASTNESS
mild	intermediate	intermediate	intermediate	Test Methods
5	5	5	4–5	Dry Heat
5	3–4	4–5	4–5	conditions
				change
				staining
daylight	daylight	daylight	daylight	Light
4–5	4–5	6–7	7–8	source
5–6	5	6–7	7–8	pale
6	5–6	7	—	medium
				heavy
5	5	—	—	Nitrogen Oxides
alkaline	alkaline	alkaline	alkaline	Perspiration
5	4–5	5	4–5	acid/alk.
4	4–5	5	5	change
				staining
mild	intermediate	intermediate	—	Pleating
5	5	4–5	—	(steam)
5	4–5	5	—	conditions
				change
				staining
ISO1	ISO2	ISO4	ISO3	Washing
5	4–5	4	4	conditions
4–5	4–5	5	5	change
				staining
				OTHER USES
				Textile
				Non-Textile
			*Not recommended for application by exhaustion methods	NOTES

C.I. Disperse Violet 35—40

C.I. Disperse Violet	35				36
CHEMICAL CLASS	Anthraquinone				Anthraquinone
C.I. CONSTITUTION NO.	—				—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER
HUE	Reddish Violet	Violet	Reddish Violet	Reddish Violet	Reddish Violet
Artificial Light (tungsten)	redder	redder	redder	redder	redder
DYEING					
Methods	N	N	Nc	HT, T	Nc, HT
Dyeing Properties					
Rate	—	—	—	moderate	moderate
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	good
Build-up	—	—	—	—	good
Reservation					
cotton	—	—	—	—	4
viscose	—	—	—	—	4
wool	—	—	—	—	2
PRINTING					
Fixation	AS	AS	PS	PS, T	PS
Dischargeability	x	x	x	x	x
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	AATCC
Dry Heat			intermediate	intermediate	III
conditions	—	—	4-5	5	5
change	—	—	5	4-5	3-4
staining	—	—	—	—	—
Light				daylight	Carbon arc
source	—	—	—	6-7	5-6
pale	—	—	—	6-7	6
medium	—	—	—	6-7	—
heavy	—	—	—	—	—
Nitrogen Oxides	4-5	—	4-5	4-5	—
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	—
change	4-5	4	4-5	4-5	—
staining	4	4	4-5	5	—
Pleating					
(steam)	conditions	—	—	severe	—
change	—	—	—	4-5	—
staining	—	—	—	4-5	—
Washing					
conditions	ISO1	ISO1	ISO3	ISO4	III
change	4-5	4	4	4-5	5
staining	5	5	4-5	4-5	5
OTHER USES					
Textile					Acetate: (AATCC)
Non-Textile					light, 5-6, N. Ox-
					ides, 3-4; Nylon
NOTES					

37	38	39	40		C.I. Disperse Violet
Anthraquinone — POLYESTER Reddish Blue little redder	Anthraquinone — POLYESTER Violet redder	Monoazo — POLYESTER Violet —	Monoazo — TRIACETATE Bluish Red redder		CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — — very good 4 4 2-3 — —	Nc, HT, T — — — — — 4 2	Nc, HT — — — — — — —	*Nc, HT — — — — 3 3 3 PS, T —	*Nc, HT, T — — — — — 3 3 3 PS, T —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC III — 3 Carbon arc 4-5 5 5-6 — — — — — — II 5 5	AATCC III — 3-4 Carbon arc 5 5-6 6 — — — — — — II 5 5	ISO — — — daylight — 2 — — — — — — ISO2 5 5	ISO severe 4-5 3 daylight 6 6 6 5 alkaline 5 5 — — — ISO3 5 5	ISO severe 4-5 3 daylight 7 7 7 — alkaline 5 4-5 — — — ISO4 4-5 3-4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
		Nylon: (ISO) light, 2-3 Acrylic	Polyester/Wool blends		OTHER USES Textile Non-Textile
			*Apply at pH 4.5-5.0		NOTES

C.I. Disperse Violet 41—46

C.I. Disperse Violet	41			42	43	
CHEMICAL CLASS	Anthraquinone			Azo	Monoazo	
C.I. CONSTITUTION NO.	—			—	—	
SUBSTRATE	ACETATE	TRIACETATE	ACRYLIC	POLYESTER	ACETATE	TRIACETATE
HUE	Bright Violet	Violet	Bluish Violet	Reddish Violet	Bright Red-dish Violet	Bright Red-dish Violet
Artificial Light (tungsten)	much redder	much redder	much redder	redder	redder	redder
DYEING						
Methods	N	Nc	N	Nc, HT, T	N	N, HT, T
Dyeing Properties						
Rate	D—slow	D—slow	—	—	C—moderate	—
Temp. range	E—poor	—	—	—	C—good	—
Levelling	C—good	—	—	—	C—good	—
Build-up	C—good	C—good	moderate	—	B—v. good	—
Reservation						
cotton	—	—	—	4	2	2
viscose	4-5	—	—	4	2	2
wool	2-3	—	—	3	1	1
PRINTING						
Fixation	AS	PS	—	PS	AS	PS
Dischargeability	x	x	—	—	✓	✓
FASTNESS						
Test Methods	ISO AATCC	ISO AATCC	ISO	AATCC	ISO AATCC	AATCC
Dry Heat	conditions	inter. V	mild	V	—	V
change	—	5	4-5	5	—	5
staining	—	4	4-5	5	—	5
Light	source	day. C.arc	daylight	Carbon arc	day. C.arc	Carbon arc
pale	6	5	5-6	5-6	5-6	4
medium	6-7	5	6	5-6	6	4
heavy	6-7	5	6-7	—	6-7	—
Nitrogen Oxides	4-5	5	4-5	—	4-5	5
Perspiration	acid/alk.	alk. alk.	alk. alk.	alkaline	alk. alk.	alkaline
change	4-5	5	5	5	5	5
staining	4	2	3-4	5	3-4	5
Pleating	conditions	inter. —	intermediate	—	—	—
(steam)	change	5	5	—	—	—
staining	—	3-4	4	—	—	—
Washing	conditions	ISO1 II	ISO2	III	ISO2 II	II
change	4-5	5	4	5	4-5	5
staining	4-5	2	3-4	5	3-4	5
OTHER USES	Modacrylics: suitable				Nylon and acrylic	
Textile						
Non-Textile						
NOTES	Good fastness to crease-resist finishing				Crease-resist finishing: excellent fastness	

44					45	46	C.I. Disperse Violet
Anthraquinone					Azo	Azo	CHEMICAL CLASS
—					—	—	C.I. CONSTITUTION NO.
ACETATE	TRIACETATE	POLYESTER	POLYPROPYLENE*		POLYESTER		SUBSTRATE
—	—	Violet	Dull Bluish Violet		Bluish Violet		HUE
—	—	yellower	redder		redder		Artificial Light (tungsten)
N	N, HT, T	Nc, HT, T	1 hr at pH 5-6 and temperatures 60-100°C		Nc, HT		DYEING Methods
—	—	—	—		—		Dyeing Properties
—	—	—	—		—		Rate
—	—	—	—		—		Temp. range
—	—	—	—		—		Levelling
4	4	4	—		—		Build-up
4	4	4	—		4		Reservation
1-2	1-2	1-2	—		—		cotton viscose wool
AS	PS, T	PS, T	—		—		PRINTING
x	x	x	—		—		Fixation
							Dischargeability
AATCC	ISO inter.	AATCC V	ISO inter.	AATCC V	ISO 30 sec/130°C	AATCC III	FASTNESS Test Methods
—	4-5	—	4-5	—	5	—	Dry Heat
—	4-5	4-5	3	4-5	5	4-5	conditions change staining
Carbon arc	day.	C.arc	day.	C.arc	daylight	Carbon arc	Light
6	6-7	7	6-7	7	3-4	5-6	source
6	6-7	7	7	7	4	6	pale
—	6-7	7	7	—	4-5	—	medium
5	3	5	—	—	5	—	heavy
alkaline	alk.	alk.	alk.	alk.	alkaline	alkaline	Nitrogen Oxides
5	5	5	5	5	4	5	Perspiration
5	5	5	5	5	4-5	5	acid/alk. change staining
—	—	—	—	—	—	—	Pleating
—	—	—	—	—	—	—	(steam)
—	—	—	—	—	—	—	conditions change staining
II	ISO3	III	ISO4	III	ISO3	II	Washing
4-5	5	5	4	5	3	5	conditions change staining
4-5	4-5	5	3-4	5	4-5	5	
Modacrylics; suitable							OTHER USES Textile
							Non-Textile
Good fastness to durable press finishing Particularly suitable for fixation by dry heat or steam					*Nickel modified fibre		NOTES

C.I. Disperse Violet 47—50

C.I. Disperse Violet	47		48	49
CHEMICAL CLASS	Azo		Azo	Azo
C.I. CONSTITUTION NO.	—		—	—
SUBSTRATE	TRIACETATE	POLYESTER	POLYESTER	ACETATE
HUE	Bluish Violet	Bluish Violet	Violet	Bluish Violet
Artificial Light (tungsten)	redder	redder	redder	redder
DYEING				
Methods	HT*	HT* T (200–210°C)	Nc, HT T (200–210°C)	N
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	—	—	—	—
Reservation				
cotton	—	—	—	—
viscose	—	—	—	—
wool	—	—	—	—
PRINTING				
Fixation	—	PS	—	AS
Dischargeability	—	—	—	✓
FASTNESS				
Test Methods	ISO	ISO	ISO	AATCC
Dry Heat				
conditions	—	intermediate	intermediate	—
change	—	5	5	—
staining	—	4–5	4–5	—
Light				
source	daylight	daylight	daylight	Carbon arc
pale	—	7	6	3–4
medium	7	7	6	4–5
heavy	—	7	6	5
Nitrogen Oxides	5	—	—	5
Perspiration				
acid/alk.	alkaline	alkaline	alkaline	—
change	5	5	5	—
staining	5	5	5	—
Pleating				
(steam)	—	—	—	—
change	—	—	—	—
staining	—	—	—	—
Washing				
conditions	ISO3	ISO4	ISO4	II
change	5	4–5	5	4–5
staining	4–5	4–5	4–5	3–4
OTHER USES				
Textile			Acetate, Acrylic, Triacetate: suitable	Triacetate, Polyester: suitable
Non-Textile				
NOTES	*Not recommended for exhaust application at temperatures below 100°C with carrier			

50					C.I. Disperse Violet
Azo —					CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	C.I. CONSTITUTION NO.
Reddish Violet	Violet	Reddish Violet	Violet	Dull Violet	SUBSTRATE
redder	redder	redder	redder	redder	HUE
					Artificial Light (tungsten)
by printing	by printing	Nc, HT	Nc, HT	by printing	DYEING Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
—	—	—	—	—	Levelling
—	—	—	5	—	Build-up
—	—	—	5	—	Reservation
—	—	—	2	—	cotton
					viscose
					wool
AS ✓	AS ✓	PS ✓	PS —	PS —	PRINTING Fixation
					Dischargeability
ISO mild 5 5	ISO — —	ISO severe 4 3	ISO severe 4 2	ISO intermediate 4 4-5	FASTNESS Test Methods
daylight	daylight	daylight	daylight	daylight	Dry Heat
—	—	5-6	6	—	conditions
4-5	3-4	5-6	6	4	change
—	—	5-6	6	—	staining
3	—	2	—	—	Light
alkaline	alkaline	alkaline	alkaline	alkaline	source
4	4	4-5	5	4	pale
4-5	3	5	5	4	medium
—	—	severe	severe	—	heavy
—	—	4-5	4	—	Nitrogen Oxides
—	—	4	4-5	—	Perspiration
ISO1	ISO3	ISO4	ISO4	ISO3	acid/alk.
4-5	3	4	4-5	4	change
4-5	3	4	4	4-5	staining
					OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Violet 51—56

C.I. Disperse Violet		51				
CHEMICAL CLASS		Anthraquinone				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Violet	Violet	Violet	Bluish Violet	Violet
Artificial Light (tungsten)		redder	redder	redder	redder	redder
DYEING						
Methods		by printing	N	by printing	by printing	by printing
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	—	—	—
	viscose	—	—	—	—	—
	wool	—	—	—	—	—
PRINTING						
Fixation		AS	AS	PS	PS	PS
Dischargeability		×	×	×	×	×
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	severe	severe	—	—
	change	—	3-4	3-4	—	—
	staining	—	2	2	—	—
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	—	6	—	3-4	—
	medium	5	6	5	4	5
	heavy	—	6	—	—	—
Nitrogen Oxides		3	5	3	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	4-5	5	5	4-5
	staining	4-5	3	5	5	5
Pleating (steam)	conditions	—	severe	—	—	—
	change	—	3-4	—	—	—
	staining	—	2	—	—	—
Washing	conditions	ISO1	ISO3	ISO3	ISO3	ISO3
	change	5	4	5	5	4
	staining	5	2-3	5	5	5
OTHER USES						
Textile						
Non-Textile						
NOTES						

52	53	54	55	56	C.I. Disperse Violet
Azo —	Azo —	Azo —	Azo —	Anthraquinone —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
POLYESTER Bluish Red little yellower	POLYPROPYLENE* Dull Bluish Violet redder	POLYPROPYLENE* Dull Bluish Violet redder	POLYESTER Reddish Violet —	POLYESTER Violet redder	
HT — — — — — — — PS ✓	1 hr at 97–100°C — — — poor — — — — —	1 hr at pH 5–6 and 97–100°C — — — — — — — — —		Nc, HT — — — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC — — — Carbon arc 6–7 7 7 — — — — — — III 5 5	AATCC — — — Carbon arc 3–4 — — — alkaline 3–4 3–4 — — — — II 4 4	AATCC — — — Carbon arc 4 5–6 — — alkaline 5 4–5 — — — — III 5 3–4		AATCC III 5 4 Carbon arc 5–6 5–6 — — — — — — II 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Acetate, nylon, triacetate: suitable					OTHER USES Textile Non-Textile
	*Unmodified fibre	*Nickel modified fibre Drycleaning fastness, 5, 4			NOTES

C.I. Disperse Violet 57—60

C.I. Disperse Violet	57			58	59
CHEMICAL CLASS	Anthraquinone			Monoazo	Anthraquinone
C.I. CONSTITUTION NO.	—			11340	—
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER	POLYESTER	POLYESTER
HUE	Bluish Violet	Bluish Violet	Reddish Blue	Reddish Violet	Bluish Violet
Artificial Light (tungsten)	redder	redder	redder	redder	redder
DYEING					
Methods	by printing	Nc, HT	Nc, HT, T		Nc, HT, T
Dyeing Properties					
Rate	—	—	—		—
Temp. range	—	—	—		—
Levelling	—	—	—		—
Build-up	—	—	—		—
Reservation					
cotton	—	—	—		—
viscose	—	—	—		—
wool	—	—	—		—
PRINTING					
Fixation	AS, T	PS, T	PS, T		PS
Dischargeability	—	—	—		—
FASTNESS					
Test Methods	ISO	ISO	ISO		AATCC
Dry Heat	conditions	intermediate	intermediate		III
change	—	5	4-5		5
staining	—	4	4		3-4
Light	source	daylight	daylight		Carbon arc
pale	6-7	6-7	7-8		6-7
medium	7	7	7-8		6-7
heavy	—	—	7-8		—
Nitrogen Oxides	3-4	3-4	5		—
Perspiration	acid/alk.	alkaline	alkaline		alkaline
change	5	4-5	5		5
staining	5	5	5		5
Pleating	conditions	—	severe		—
(steam)	change	—	4-5		—
staining	—	—	5		—
Washing	conditions	ISO1	ISO3		III
change	5	4-5	4-5		5
staining	4-5	4-5	4-5		5
OTHER USES					
Textile					
Non-Textile					
NOTES	Good fastness to permanent press finishing				

60		C.I. Disperse Violet
Azo — POLYESTER Violet —		CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — — — — — — — —		DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC V 5 5 Carbon arc — 6 — 5 alkaline 5 5 — — — III 5 5		FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
		OTHER USES Textile Non-Textile
		NOTES

NOTES

C.I. Disperse Blue 1—1:1

C.I. Disperse Blue		1						1:1
CHEMICAL CLASS		Anthraquinone						Very similar to C.I. Disperse Blue 1
C.I. CONSTITUTION NO.		64500						
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC		
HUE		Blue	Blue	Blue	Greenish Blue	—		
Artificial Light (tungsten)		greener	greener	greener	greener	—		
DYEING		N	N	N	Nc, HT	N		
Methods								
Dyeing Properties								
Rate								
Temp. range								
Levelling								
Build-up								
Reservation		cotton	3	4	3	—		
		viscose	2-3	3	3	—		
		wool	2-3	2-3	2-3	—		
PRINTING		AS	AS	PS, (ASc)	—	—		
Fixation								
Dischargeability								
		x	x	x	x	x		
FASTNESS		ISO AATCC		ISO AATCC		ISO		
Test Methods		— —		inter. —		intermediate —		
Dry Heat		— —		5 —		4-5 —		
		— —		4 —		4-5 —		
Light		daylight C.arc		daylight C.arc		daylight		
		2-3 —		3 —		4		
		3-4 4		3-4 2		4-5 5		
		4-5 —		4-5 —		4 5-6		
Nitrogen Oxides		2 2		— —		2 5		
Perspiration		alkaline alkaline		alkaline —		alkaline		
		4 4-5		4-5 —		5		
		3 3		3 —		5		
Pleating		— —		inter. —		intermediate		
(steam)		— —		5 —		5		
		— —		4 —		4-5		
Washing		ISO 1 I		ISO 2 II		ISO 3		
		4 3-4		4 3		4-5		
		3-4 3-4		3 3		4-5		
OTHER USES								
Textile								
Non-Textile		Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics Solvent Dye: see C.I. Solvent Blue 18						
NOTES		Literature: <i>Vickerstaff</i> , 273, 368, 371						

C.I. Disperse Blue 2—6

C.I. Disperse Blue	2		3			
CHEMICAL CLASS	Anthraquinone		Anthraquinone			
C.I. CONSTITUTION NO.	—		61505			
SUBSTRATE	ACETATE	NYLON	ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE	Reddish Navy redder	Reddish Navy redder	Bright Blue duller	Bright Blue duller	Bright Blue duller	Blue duller
Artificial Light (tungsten)						
DYEING Methods	N	N	N	N	N, HT	N
Dyeing Properties						
Rate	—	—	C—moderate	rapid	D—slow	slow
Temp. range	good	—	C—good	very good	D—moderate	moderate
Levelling	good	—	C—good	good	C—good	moderate
Build-up	good	—	B—very good	very good	B—very good	moderate
Reservation						
cotton	—	2	3-4	4	3	—
viscose	—	1	3-4	4	3-4	4
wool	—	1	3	2-3	3	3
PRINTING						
Fixation	AS	AS	AS*	AS*	PS,* AS	—
Dischargeability	×	×	×	×	×	×
FASTNESS						
Test Methods	ISO	ISO	ISO	AATCC	ISO	AATCC
Dry Heat	conditions	intermediate	mild	—	inter.	—
change	—	—	5	—	3-4	—
staining	—	4	5	—	3	—
Light	source	daylight	day.	C. arc	day.	C. arc
pale	3	—	4	3	4	3
medium	4	5	5	5	5	4
heavy	5	—	5-6	6	5-6	4-5
Nitrogen Oxides	2	—	2	2	4	4
Perspiration	acid/alk.	alkaline	alk.	alk.	alk.	alk.
change	4	4	4-5	4-5	5	—
staining	2	2	3	3	3	2-3
Pleating (steam)	conditions	severe	mild	—	inter.	—
change	—	4-5	5	—	4-5	—
staining	—	2-3	5	—	3	—
Washing	conditions	ISO 1	ISO 2	II	ISO 2	II
change	4	4-5	4	4-5	4	3-4
staining	1	2-3	3-4	4	3-4	3-4
OTHER USES						
Textile			Polyester: limited build up and poor light fastness			
Non-Textile	Wool Sheepskins and Furs		Nylon: standard dye for ladies' hose in admixture with C.I. Disperse Reds 1 or 19 and Yellow 3			
			Wool Sheepskins and Furs: light (ISO) 3			
			Plastics: surface dyeing of thermoplastics. See BP 539,673; BP 576793; BP 545117; BIOS 259,15			
NOTES			*Has a tendency to volatalise on steaming			
			Literature: Vickerstaff, 148, 273, 368, 371, 387			

3:1	4	5	6	C.I. Disperse Blue
Very similar to C.I. Disperse Blue 3	Azo — ACETATE Reddish Navy* duller	Anthraquinone 62035 ACETATE Bright Blue little greener	Anthraquinone 62050 ACETATE Bright Blue little greener	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
	DD base dyeing — poor — good — 4 3 — ×	N rapid excellent very good good 4 4 4 AS ×	N moderate very good very good good 4 4 2 AS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	ISO — — — daylight 2 3 4 5 alkaline 4-5 5 — — — ISO1 5 4	ISO — — — daylight 6-7 7 7 2-3 alkaline 3-4 3-4 — — — — — —	ISO — — — daylight 7 7-8 7-8 4 alkaline 3-4 3-4 — — — — — —	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Nylon	Nylon: lower light fastness than on ace- tate Woolskins and Furs Plastics	Nylon: lower light fastness than on ace- tate Woolskins and Furs Plastics	OTHER USES Textile Non-Textile
	*Develop with C.I. Developer 8 (B.O.N.A.)	Gives good penetra- tion	Gives good penetra- tion	NOTES

C.I. Disperse Blue 7—9

C.I. Disperse Blue		7										7:1
CHEMICAL CLASS		Anthraquinone										Very similar to C.I. Disperse Blue 7
C.I. CONSTITUTION NO.		62500										
SUBSTRATE		ACETATE		NYLON		TRIACETATE		POLYESTER		ACRYLIC		
HUE		Bright Greenish Blue much greener		Bright Greenish Blue much greener		Bright Greenish Blue much greener		Greenish Blue much greener		Greenish Blue greener		
Artificial Light (tungsten)												
DYEING		N		N		N, HT		Nc, HT, T		N		
Methods												
Dyeing Properties		D—slow		slow		D—slow		slow		slow		
Rate		D—moderate		moderate		D—moderate		moderate		moderate		
Temp. range		D—moderate		moderate		D—moderate		moderate		moderate		
Levelling		B—very good		very good		B—very good		good		moderate		
Build-up												
Reservation		4		3		3-4		3-4		—		
cotton		4		3-4		3-4		3-4		4		
viscose		2-3		2		2		2		2		
wool												
PRINTING		AS		AS		PS, (AS)		PS		—		
Fixation		X		X		X		X		X		
Dischargeability												
FASTNESS		ISO AATCC		ISO AATCC		ISO AATCC		ISO		ISO AATCC		
Test Methods		mild		inter.		inter.		intermediate		mild		
Dry Heat		5		4-5		4-5		5		4-5		
conditions		—		—		5		4-5		—		
change		5		4		4-5		5		5		
staining												
Light		day.		day.		day.		daylight		day.		
source		4-5		4-5		3-4		4-5		6		
pale		5-6		5		4-5		4		6-7		
medium		6		5-6		5-6		4		6-7		
heavy										—		
Nitrogen Oxides		2-3		5		2-3		5		5		
Perspiration		alk.		alk.		alk.		alkaline		alk.		
acid/alk.		4-5		4-5		4-5		5		5		
change		3		3-4		4		4-5		5		
staining												
Pleating		mild		inter.		inter.		intermediate		inter.		
(steam)		5		5		5		4-5		4-5		
conditions		—		—		4-5		4-5		5		
change		5		4-5								
staining												
Washing		ISO 2		ISO 2		ISO 3		ISO 4		ISO 3		
conditions		4		4-5		4-5		4-5		4-5		
change		3		3-4		4-5		4-5		5		
staining												
OTHER USES												
Textile												
Non-Textile		Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics										
NOTES												

8	9						C.I. Disperse Blue
Anthraquinone — ACETATE Reddish Blue redder, duller	Anthraquinone 61115* ACETATE NYLON TRIACETATE POLYESTER Blue Blue Blue Blue greener greener greener greener						CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N rapid moderate good good 4 4 1-2 AS ×	N moderate moderate good good — 4 2 AS ×	N — — — — — — —	N — — — — — — —	Nc, HT — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool		PRINTING Fixation Dischargeability
A* — — — — 5-6 — 4 — 4-5 — — — — — 4-5 —	ISO AATCC — — — — — — daylight C.arc 6 4-5 7 — 7	ISO AATCC — — — — — — daylight C.arc 4-5 5-6 4-5 — 6	ISO — — — daylight — 5-6 — — alk. 4-5 4-5 — — — — 4-5 4-5	ISO — — — daylight — 5-6 — — alkaline 4-5 4-5 — — — — 4-5 4-5	ISO intermediate 4-5 3-4 daylight 5 4-5 4-5 5 alkaline 4-5 5 severe 4-5 4 ISO 4 4 4	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining	
	Plastics: surface dyeing of thermoplastics, giving good fastness to light on methyl methacrylate						OTHER USES Textile Non-Textile
*For details of Tests see <i>Colour Index</i> , 2nd Edn. 1956	*Note: the commercial products originally listed under this C.I. Generic Name were mixtures, the main component of which (C.I. 61115) was not available as a commercial entity on its own						NOTES

C.I. Disperse Blue 10—15

C.I. Disperse Blue	10		11			12
CHEMICAL CLASS	Azo		Azo			Azo
C.I. CONSTITUTION NO.	—		11260			—
SUBSTRATE	ACETATE	NYLON	ACETATE	ACETATE	TRIACETATE	ACETATE
HUE	Reddish Blue redder	Reddish Blue redder	Navy (1*) duller, greener	Reddish Navy (2*) redder	Reddish Navy (2*) redder	Dull Red- dish Blue little redder
Artificial Light (tungsten)						
DYEING						
Methods	N	N	DD	DD	DD†	N
Dyeing Properties						
Rate	rapid	—	base dyeing	base dyeing	base dyeing	moderate
Temp. range	poor	—	B—rapid	B—rapid	B—rapid	poor
Levelling	good	—	C—good	C—good	—	good
Build-up	good	—	C—good	C—good	B—very good	moderate
Reservation						
cotton	5	—	—	—	—	5
viscose	5	—	4-5	4-5	—	5
wool	2	—	2	2	—	2
PRINTING						
Fixation	AS	AS	—	—	—	—
Dischargeability	✓	✓	✓	✓	✓	✓
FASTNESS						
Test Methods	A*	A*	ISO	ISO	ISO	ISO
Dry Heat						
conditions	—	—	—	—	severe	—
change	—	—	—	—	4-5	—
staining	—	—	—	—	4	—
Light						
source	—	—	daylight	daylight	daylight	daylight
pale	—	—	4	4	—	2
medium	1-2	1	5	5	4	3
heavy	—	—	5-6	5-6	4-5	3
Nitrogen Oxides	5	5	3-4	3-4	4-5	2
Perspiration						
acid/alk.	—	—	alkaline	alkaline	alkaline	alkaline
change	3-4	2-3	4	4	5	4-5
staining	—	—	5	5	5	4-5
Pleating						
(steam)						
conditions	—	—	—	—	severe	—
change	—	—	—	—	5	—
staining	—	—	—	—	5	—
Washing						
conditions	—	—	ISO 2	ISO 2	ISO 3	—
change	4-5	4-5	5	5	5	—
staining	—	—	5	5	5	—
OTHER USES						
Textile						
Non-Textile						
NOTES	*For details of Tests see <i>Colour Index</i> , 2nd Ed., 1956		*Develop with 1—C.I. Developer 9 2—C.I. Developer 26 †Addition of carrier to base dyeing may be useful as this improves the rate of subsequent coupling Suitable for discharge printing			Suitable for discharge printing

13 and 13:1†		14			15	C.I. Disperse Blue
Anthraquinone		Anthraquinone			Azo	CHEMICAL CLASS
ACETATE	NYLON	ACETATE	NYLON	TRIACETATE	11435 ACETATE	C.I. CONSTITUTION NO.
						SUBSTRATE
Reddish Navy duller	Reddish Navy duller	Bright Blue duller	Blue duller	Blue much duller	Greenish Blue greener	HUE
						Artificial Light (tungsten)
N	N	N	N	N	N	DYEING Methods
—	—	E—very slow	moderate	D—slow	moderate	Dyeing Properties
good	—	D—moderate	moderate	E—poor	very good	Rate
—	—	D—moderate	very good	C—good	good	Temp. range
good	—	C—good	moderate	E—poor	good	Levelling
—	—	4	4-5	4-5	4	Build-up
3-4	—	4	4-5	4-5	4	Reservation
3	—	3	3	3	1-2	cotton viscose wool
AS	AS	AS	AS	PS	—	PRINTING
x	x	x	x	x	✓	Fixation
						Dischargeability
ISO	ISO	ISO	ISO	ISO	C*	FASTNESS
—	intermediate	—	intermediate	intermediate	—	Test Methods
—	—	—	4	5	—	Dry Heat
—	4-5	—	2-3	2-3	—	conditions change staining
daylight	daylight	daylight	daylight	daylight	—	Light
3	—	4	4	4	3	source
4	—	5	4-5	4	4	pale
5	5	5-6	5	—	4-5	2-3 medium heavy
2	—	2-3	4	2-3	3	3
alkaline	alkaline	alkaline	alkaline	alkaline	—	Nitrogen Oxides
4	4	4-5	4-5	5	4	Perspiration
1	1	3-4	2-3	3-4	—	acid/alk. change staining
—	severe	—	intermediate	intermediate	—	Pleating
—	4-5	—	5	5	—	(steam)
—	2-3	—	3	3-4	—	conditions change staining
ISO1	ISO1	ISO2	ISO2	ISO3	—	Washing
4	4	4	4	4-5	4	conditions change staining
2	2-3	3-4	3-4	4-5	—	
		Polyester: good build up but only moderate fastness to light (3, 3, 3) and sublimation PVC Fibres Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics			Nylon: (A*) Light 2-3 PVC Fibres Wool Sheepskins and Furs	OTHER USES
						Textile
						Non-Textile
†Blue 13:1 is similar in constitution and properties to Blue 13		Literature: <i>Vickerstaff</i> 273, 368, 371, 372, 375 Bird, <i>JSDC</i> , 70 (1954), 74, 76			*For details of Tests see <i>Colour Index</i> , 2nd Edn., 1956 Suitable for discharge printing	NOTES

C.I. Disperse Blue 16—19

C.I. Disperse Blue	16				17	18
CHEMICAL CLASS	Anthraquinone				Anthraquinone	Anthraquinone
C.I. CONSTITUTION NO.	—				—	—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	ACRYLIC	ACETATE	ACETATE
HUE	Bright Blue	Blue	Bright Blue	Blue	Greenish Blue	Bright Blue
Artificial Light (tungsten)	greener	greener	greener	greener	greener	unchanged
DYEING						
Methods	N	N	N, HT	N	N	N
Dyeing Properties						
Rate	moderate	—	—	—	slow	moderate
Temp. range	very good	—	—	—	moderate	moderate
Levelling	good	—	—	—	—	good
Build-up	good	—	—	—	good	good
Reservation						
cotton	4	—	—	—	4	5
viscose	4	—	—	—	4	5
wool	1-2	—	—	—	1-2	1-2
PRINTING						
Fixation	not suitable	—	—	—	AS	not suitable
Dischargeability	x	x	x	x	x	x
FASTNESS						
Test Methods	ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat						
conditions	—	—	intermediate	intermediate	—	—
change	—	—	4-5	4	—	—
staining	—	—	4-5	3-4	—	—
Light						
source	daylight	daylight	daylight	daylight	daylight	daylight
pale	3-4	4	3-4	6	4	5-6
medium	4-5	4	4-5	6-7	5	6
heavy	5-6	4-5	5	6-7	5-6	7
Nitrogen Oxides	2-3	—	3	—	2	2
Perspiration						
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
change	4-5	4-5	5	4-5	5	5
staining	3-4	5	3-4	5	4-5	4-5
Pleating						
(steam)						
conditions	—	—	intermediate	—	—	—
change	—	—	5	—	—	—
staining	—	—	3-4	—	—	—
Washing						
conditions	ISO 2	ISO 2	ISO 3	ISO 3	ISO 1	ISO 2
change	4	4	4-5	4-5	4-5	4-5
staining	2-3	2-3	3-4	5	4	3-4
OTHER USES						
Textile	Polyester: not recommended PVC Fibres				Nylon: hue, greenish blue	Nylon: hue, blue
Non-Textile	Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics				Wool Sheep- skins and Furs Thermoplastics	PVC Fibres Wool Sheep- skins and Furs Thermoplastics
NOTES						

19						C.I. Disperse Blue
Anthraquinone						CHEMICAL CLASS
61110						C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC		SUBSTRATE
Bright Reddish Blue much redder	Blue duller, redder	Bright Reddish Blue much redder	Blue much redder	Reddish Blue much redder		HUE
						Artificial Light (tungsten)
N	N	Nc, HT	Nc, HT, T*	N		DYEING Methods
D—slow E—poor E—poor C—good	slow poor moderate moderate	— — — good	— — — good	— — — moderate		Dyeing Properties Rate Temp. range Levelling Build-up
— 5 4	— 5 4	— — —	— — —	— — —		Reservation cotton viscose wool
AS x	AS x	PS x	PS, (ASc) x	not recommended x		PRINTING Fixation Dischargeability
ISO mild 5 4	AATCC — — —	ISO inter. 4 4	AATCC — — —	ISO intermediate 5 4	ISO mild 4-5 5	FASTNESS Test Methods Dry Heat conditions change staining
daylight 4-5 5-6 6-7	C.arc — 5 —	daylight 4-5 5 6	C.arc — 4 —	daylight 4 5 5	daylight 6-7 6-7 —	Light source pale medium heavy
2-3	1	3-4	5	2-3	—	Nitrogen Oxides
alkaline 5 4-5	— —	alkaline 4-5 4	— —	alkaline 5 4-5	alkaline 5 5	Perspiration acid/alk. change staining
mild 5 4	— —	inter. 4-5 4	— —	intermediate 5 3-4	severe 5 4	Pleating (steam) conditions change staining
ISO 2 4 3-4	II 5 —	ISO 2 4 4	II 5 —	ISO 3 4-5 4	ISO 4 4-5 4	ISO 3 5 5
Blends with wool: gives good reserve of wool PVC Fibres: Light (ISO), 5, 5, 5-6; Washing (ISO 2), 4-5, 5						OTHER USES Textile Non-Textile
*Fixation at 190°C—pale to medium depths only due to limited fastness to sublimation Tends to give anomalous light fastness with certain azo yellows and reds						NOTES

C.I. Disperse Blue 20—25

C.I. Disperse Blue	20				21	22
CHEMICAL CLASS	Aminonaphthoquinone				Monoazo	Anthraquinone
C.I. CONSTITUTION NO.	—				—	60715
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER		ACETATE	ACETATE
HUE	Bright Greenish Blue	Blue	Blue		Blue	Bright Reddish Blue
Artificial Light (tungsten)	—	—	—		little greener	duller, redder
DYEING Methods	N	N, HT	Nc, HT		N	N
Dyeing Properties						
Rate	B—rapid	—	—		slow	B—rapid
Temp. range	B—very good	—	—		moderate	C—good
Levelling	C—good	—	—		good	C—good
Build-up	C—good	—	—		good	A—excellent
Reservation						
cotton	4	—	—		4	—
viscose	4	—	—		4	4
wool	2	—	—		2	3
PRINTING						
Fixation	AS	—	—		AS	Tends to sublime
Dischargeability	x	—	—		✓	x
FASTNESS						
Test Methods	ISO	AATCC	ISO	AATCC	ISO	ISO
Dry Heat	mild	—	inter.	VI	intermediate	—
conditions	5	—	4-5	5	4	—
change	5	—	4-5	2-3	3-4	—
staining						
Light	source	C. arc	daylight	C. arc	daylight	daylight
pale	4-5	4	4-5	4-5	6	4
medium	5	5	5	5	6-7	4-5
heavy	6	6	6	5-6	6-7	5
Nitrogen Oxides	3-4	5	3-4	5	4-5	2-3
Perspiration	alkaline	—	alkaline	—	alkaline	alkaline
acid/alk.	4	—	4-5	—	5	4-5
change	1-2	—	3	—	5	3
staining						
Pleating	conditions	—	—	inter.	intermediate	—
(steam)	change	—	—	5	5	—
	staining	—	—	3-4	4-5	—
Washing	conditions	ISO 1	ISO 3	III	ISO 4	ISO 2
change	4	2	4-5	3	4-5	4
staining	3-4	1	3-4	3-4	4-5	3-4
OTHER USES						
Textile					Nylon: hue, bluish green	Nylon: hue, blue; light, 4-5, 5, 5
Non-Textile					Wool Sheepskins and Furs Thermoplastics	Wool Sheepskins and Furs Thermoplastics
NOTES	Dye at pH 5.5-6.0 Not recommended for thermofixation or for goods to be given a permanent press finish Similar to C.I. Disperse Blue 58					

23 and 23:1		24		25	C.I. Disperse Blue
Anthraquinone 61545 (23:1 is similar)		Anthraquinone 61515		— —	CHEMICAL CLASS
ACETATE	NYLON	ACETATE	NYLON	ACETATE	C.I. CONSTITUTION NO.
Bright Blue	Bright Blue	Bright Blue	Blue	Bright Blue	SUBSTRATE
duller	duller, greener	greener	greener	little greener	HUE
					Artificial Light (tungsten)
N	N	N	N	N	DYEING Methods
D—slow D—moderate C—good C—good	slow moderate good good	slow poor — moderate	— — — —	moderate moderate — good	Dyeing Properties Rate Temp. range Levelling Build-up
— 3-4 2-3	— 4 2-3	5 5 4	— — —	4 4 1-2	Reservation cotton viscose wool
AS x	AS x	AS x	AS —	AS x	PRINTING Fixation Dischargeability
ISO — — —	ISO intermediate 4-5 4-5	ISO — — —	ISO — — —	ISO — — —	FASTNESS Test Methods
daylight 4 4-5 4-5	daylight 4-5 5 5-6	daylight 6 6 6-7	daylight 4-5 4-5 4-5	daylight 6 6-7 7	Dry Heat conditions change staining
1	—	2-3	—	3	Light source pale medium heavy
alkaline 5 3	alkaline 4-5 3	alkaline 5 4-5	alkaline 5 4-5	alkaline 5 —	Nitrogen Oxides
— — —	intermediate 5 5	— — —	— — —	— — —	Perspiration acid/alk. change staining
ISO 2 4 3-4	ISO 1 4-5 4-5	ISO 1 4 4	ISO 1 4-5 4	ISO 1 5 5	Pleating conditions (steam) change staining
					Washing conditions change staining
Wool Sheepskins and Furs Thermoplastics: surface dyeing		Wool Sheepskins and Furs		Nylon. Polyester. Acrylic Wool Sheepskins and Furs Thermoplastics	OTHER USES Textile Non-Textile
Gives good penetration		Literature: Vickerstaff, 148, 273, 368, 371, 375 Bird, <i>JSDC</i> , 70 (1954), 73, 74, 76 Bird <i>et al.</i> , <i>JSDC</i> 71 (1955), 139, 140, 141			NOTES

C.I. Disperse Blue		26				
CHEMICAL CLASS		Anthraquinone				
C.I. CONSTITUTION NO.		63305				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Bright Blue	Blue	Blue	Blue	Blue
Artificial Light (tungsten)		redder	duller	duller	greener, duller	greener, duller
DYEING						
Methods		N	N	N, HT	Nc, HT	N
Dyeing Properties					Nc HT	
Rate		D—slow	slow	slow	— —	—
Temp. range		D—moderate	good	moderate	— —	—
Levelling		C—good	good	moderate	moderate —	—
Build-up		C—good	very good	moderate	moderate good	moderate
Reservation	cotton	3	3-4	3	3	—
	viscose	4	4-5	2-3	3	—
	wool	2	3	2-3	2	—
PRINTING						
Fixation		AS	AS	PS, (AS)	PS, (ASc)	PS
Dischargeability		×	×	×	×	×
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	intermediate	intermediate	intermediate	mild
	change	5	4-5	5	4-5	4-5
	staining	4-5	3	3-4	3	5
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	5	4-5	4-5	6	6-7
	medium	6	5	5	5-6	6-7
	heavy	6	5	5-6	5-6	—
Nitrogen Oxides		2	—	2-3	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	4-5	5	4-5	5	5
	staining	3-4	3	4	5	5
Pleating (steam)	conditions	mild	severe	intermediate	intermediate	intermediate
	change	5	4-5	4-5	5	4-5
	staining	5	3	4	4-5	4-5
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 4	ISO 3
	change	4	5	4	5	4-5
	staining	3-4	2-3	3	4	5
OTHER USES						
Textile						
Non-Textile						
NOTES		May give anomalous light fastness results in admixture with certain azo yellow dyes due to catalytic fading Literature: Vickerstaff, 131, 273, 368, 371, 375				

27						28	29		C.I. Disperse Blue
Anthraquinone 60767						Anthraquinone 62065	— —		CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Dull Blue duller	TRIACETATE Dull Blue duller	POLYESTER Dull Blue duller	ACETATE Bright Blue unchanged			ACETATE Navy duller, greener	NYLON Navy duller, greener		
N	Nc, HT	(Nc), HT, T	N			N	N	DYEING Methods	
D—slow E—poor C—good C—good	D—slow — — C—good	— — — —	slow poor — moderate			moderate excellent good good	— — — —	Dyeing Properties Rate Temp. range Levelling Build-up	
— 4-5 2	— — —	— — —	5 5 4			4 4 1-2	— — —	Reservation cotton viscose wool	
AS x	PS, (AS) x	PS, T x	AS x			AS x	AS x	PRINTING Fixation Dischargeability	
ISO mild 5 5	AATCC — — —	ISO severe 4-5 4-5	AATCC — — —	ISO inter. 5 4-5	AATCC I 5 5	ISO — — —	ISO — — —	ISO — — —	FASTNESS Test Methods Dry Heat conditions change staining
day. 6 6 6-7	C.arc 5 6 —	day. 6 6-7 7	C.arc 6-7 7 —	day. 6 6-7 7	C.arc 6-7 6 —	daylight 6-7 7 7	daylight 3 5 6-7	daylight — 4-5 —	Light source pale medium heavy
5	4-5	5	5	—	—	2-3	4	—	Nitrogen Oxides
alk. 5 4	alk. 5 5	alk. 5 5	alk. 5 4-5	alk. 5 5	alk. 5 5	alkaline 5 4-5	alkaline 4 2-3	alkaline 4 2	Perspiration acid/alk. change staining
mild 5 5	— —	severe 5 5	— —	severe 5 5	— —	— —	— —	— —	Pleating (steam) conditions change staining
ISO 2 4-5 4	II 5 4	ISO 3 4-5 5	— —	ISO 4 5 4-5	— —	ISO 1 4 4	ISO 2 2-3 2	ISO 2 3 1	Washing conditions change staining
Nylon: poor light fastness						Nylon: hue, bright blue	Wool Sheepskins and Furs Plastics: surface dyeing of cellulose acetate		OTHER USES Textile Non-Textile
Has outstanding fastness to nitrogen oxides for a dye of the anthraquinone class Alkaline dye liquors should be avoided									NOTES

C.I. Disperse Blue 30—34

C.I. Disperse Blue	30	31			
CHEMICAL CLASS	Azo	Anthraquinone			
C.I. CONSTITUTION NO.	—	64505			
SUBSTRATE	ACETATE	ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE	Blue duller, greener	Bright Blue duller	Blue duller	Blue duller	Blue duller
Artificial Light (tungsten)					
DYEING Methods	N	N	N	N, HT	N
Dyeing Properties	moderate	D—slow	very rapid	D—slow	—
Rate	poor	B—very good	good	C—good	—
Temp. range	good	D—moderate	good	D—moderate	—
Levelling	good	B—very good	very good	A—excellent	very good
Build-up					
Reservation	4-5	2	4	3	—
cotton	4-5	2	3	3	—
viscose	2	2	2-3	2	—
wool					
PRINTING	—	AS	—	PS	—
Fixation	✓	×	×	×	×
Dischargeability					
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	ISO
Dry Heat	—	—	intermediate	severe	—
conditions	—	—	5	5	—
change	—	—	4-5	3-4	—
staining					
Light	daylight	daylight	daylight	daylight	daylight
source	3	2-3	3-4	3	4
pale	3	3	4	3-4	5
medium	3	4	4-5	4	—
heavy					
Nitrogen Oxides	4-5	3	—	4	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	4-5	3-4	4-5	5	5
change	3	2	2	4	5
staining					
Pleating	—	—	severe	severe	intermediate
(steam)	—	—	4-5	5	5
change	—	—	3	4-5	5
staining					
Washing	ISO 1	ISO 1	ISO 2	ISO 3	ISO 2
conditions	4-5	4	4-5	5	5
change	4-5	3	2	4-5	5
staining					
OTHER USES					
Textile	Nylon: hue, blue				
Non-Textile		Wool Sheepskins and Furs Plastics: surface dyeing of thermoplastics			
NOTES	Suitable for discharge printing				

32			33		34	C.I. Disperse Blue
Anthraquinone			Azo		Anthraquinone	CHEMICAL CLASS
—			—		61510	C.I. CONSTITUTION NO.
ACETATE	NYLON	POLYESTER	ACETATE	NYLON	ACETATE	SUBSTRATE
Bright Blue	Bright Blue	Blue	Dull Blue	Dull Blue	Blue	HUE
little greener	little greener	little greener	redder	redder	unchanged	Artificial Light (tungsten)
N	N	Nc, HT	N	N	N	DYEING Methods
moderate	—	—	rapid	—	slow	Dyeing Properties
—	—	—	—	—	good	Rate
good	—	—	moderate	—	good	Temp. range
good	—	—	very good	—	good	Levelling
4	—	—	5	—	4	Build-up
4	—	—	5	—	4	Reservation
1-2	—	—	dyed	—	1-2	cotton
AS	AS	—	—	—	AS	viscose
x	x	—	√	√	x	wool
A*	A*	AATCC III	A*	A*	ISO	PRINTING
—	—	—	—	—	—	Fixation
—	—	3	—	—	—	Dischargeability
—	—	Carbon arc	—	—	daylight	FASTNESS
5	4	4-5	1	1	3-4	Test Methods
—	—	—	—	—	4	Dry Heat
1	5	—	5	5	4-5	conditions
—	—	—	—	—	4	change
5	5	—	3-4	3-4	alkaline	staining
—	—	—	—	—	3	Light
—	—	—	—	—	—	source
—	—	—	—	—	—	pale
3	3	II	—	—	ISO1	medium
—	—	5	4-5	4-5	3-4	heavy
						Nitrogen Oxides
						Perspiration
						acid/alk.
						change
						staining
						Pleating
						(steam)
						conditions
						change
						staining
						Washing
						conditions
						change
						staining
					Nylon: hue, blue	OTHER USES
					Plastics: surface dyeing of thermo-plastics	Textile
						Non-Textile
*For details of Tests see <i>Colour Index</i> , 2nd Edition, 1956			Suitable for discharge printing *For details of Tests see <i>Colour Index</i> , 2nd Ed., 1956		Gives good penetration due to partial solubility in water	NOTES

C.I. Disperse Blue 35—40

C.I. Disperse Blue		35					36
CHEMICAL CLASS		Anthraquinone					Monoazo
C.I. CONSTITUTION NO.		—					—
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	ACETATE
HUE		Dull Blue	Dull Blue	Dull Blue	Dull Blue	Blue	Reddish Blue
Artificial Light (tungsten)		duller	duller	duller	duller	—	redder
DYEING							
Methods		N	N	N, (Nc), HT	Nc, HT	N	N
Dyeing Properties							
Rate		C—moderate	slow	D—slow	Nc HT	—	slow
Temp. range		C—good	moderate	D—moderate	—	—	moderate
Levelling		C—good	good	C—good	— good	—	good
Build-up		B—v. good	very good	B—very good	v. good good	—	good
Reservation	cotton	2-3	3	2	3	—	5
	viscose	3-4	3-4	3	3-4	—	5
	wool	2-3	1-2	2	1	—	2
PRINTING							
Fixation		AS	AS	PS	PS	PS	—
Dischargeability		x	x	x	x	x	✓
FASTNESS							
Test Methods		ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	intermediate	intermediate	intermediate	mild	—
	change	5	4	5	4-5	4-5	—
	staining	4-5	2-3	4	3-4	4-5	—
Light	source	daylight	daylight	daylight	daylight	daylight	daylight
	pale	3	4	3	5	5	3
	medium	4	4-5	4	6	5-6	4
	heavy	4-5	5	5	6	6	5
Nitrogen Oxides		3	5	3-4	4-5	—	4-5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
	change	4-5	5	5	5	5	5
	staining	3	3	4	5	5	4
Pleating (steam)	conditions	mild	intermediate	intermediate	intermediate	intermediate	—
	change	5	4-5	5	5	4-5	—
	staining	5	4	4	5	4	—
Washing	conditions	ISO 1	ISO 2	ISO 3	ISO 4	ISO 3	ISO 2
	change	4	4	4	4-5	4-5	4
	staining	3	3	3-4	3-4	5	3
OTHER USES							
Textile							Nylon: hue, blue
Non-Textile							Wool Sheepskins and Furs Thermoplastics
NOTES		May give rise to catalytic fading of certain azo yellow dyes					Suitable for discharge printing

37	38	39	40			C.I. Disperse Blue
	Azo 11430 ACETATE Dull Greenish Blue little greener	Anthraquinone — POLYVINYLCHLORIDE Bright Blue —	Anthraquinone — ACETATE Bright Blue duller, greener	— TRIACETATE Bright Blue greener	POLYESTER Bright Blue little greener	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
	N moderate good very good good 4 4 1-2 — ✓		N — — — — 4 4 3 — x	N, HT — — — — 4 4-5 2 — x	HT, T — — — — 5 5 1 — x	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	ISO — — — daylight 3 4 5 4 alkaline 4 4 — — — ISO 1 4 4	ISO — — — daylight — 5 — — alkaline 4-5 5 — — — ISO 2 4-5 5	ISO — — — daylight 4 5 6 4 alkaline 5 5 — — — ISO 1 5 5	ISO — — — daylight 4-5 5 6 4 alkaline 5 5 intermediate 5 5 ISO 3 5 5	ISO — — — daylight 6 6-7 7 5 alkaline 5 5 severe 4-5 4-5 ISO 4 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Nylon PVC Fibres Wool Sheepskins and Furs					OTHER USES Textile Non-Textile
	Suitable for discharge printing	Literature: BP 765356 USP 2795477 FP 1085424 GP 1012284 Ital. P 518048				NOTES

C.I. Disperse Blue 41—48

C.I. Disperse Blue	41	42	43	44	45	
CHEMICAL CLASS		Azo	Azo	Azo	Anthraquinone	
C.I. CONSTITUTION NO.		—	—	—	—	
SUBSTRATE		ACETATE	ACETATE	ACETATE	ACETATE	POLYESTER
HUE		Reddish Blue	Reddish Blue	Reddish Navy	Dull Blue	Dull Blue
Artificial Light (tungsten)		redder	redder, duller	—	weaker, greener	weaker, greener
DYEING	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 3					
Methods		N	N	N	N	Nc, HT
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation		—	—	—	—	—
cotton		—	—	4	4	4
viscose		—	—	—	—	—
wool		—	—	—	—	—
PRINTING						
Fixation		—	—	—	—	—
Dischargeability		✓	✓	✓	—	—
FASTNESS						
Test Methods		AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat	conditions	—	—	—	—	III
change	change	—	—	—	—	—
staining	staining	—	—	—	—	4-5
Light	source	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
pale	pale	—	—	—	—	4-5
medium	medium	4	4-5	5	6	5
heavy	heavy	—	—	—	—	5-6
Nitrogen Oxides		5	5	5	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	change	5	5	5	5	5
staining	staining	5	5	5	5	5
Pleating	conditions	—	—	—	—	—
(steam)	change	—	—	—	—	—
staining	staining	—	—	—	—	—
Washing	conditions	I	I	I	III	II
change	change	4-5	4-5	4-5	5	5
staining	staining	4	4	4	5	5
OTHER USES						
Textile						
Non-Textile						
NOTES				Suitable for discharge printing		

46	47			48		C.I. Disperse Blue
This C.I. Generic Name is discontinued	<div>—</div> <div>—</div> <div>ACETATE</div> <div>Navy (1*)</div> <div>duller</div>			<div>—</div> <div>—</div> <div>ACETATE</div> <div>Navy (1*)</div> <div>duller</div>		CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
	<div>DD</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4</div> <div>—</div> <div>—</div> <div>—</div>	<div>DD</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4</div> <div>—</div> <div>—</div> <div>—</div>	<div>2 Az</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4-5</div> <div>—</div> <div>—</div> <div>—</div>	<div>DD</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4</div> <div>—</div> <div>—</div> <div>—</div>	<div>DD</div> <div>—</div> <div>—</div> <div>—</div> <div>—</div> <div>4</div> <div>—</div> <div>—</div> <div>—</div>	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
This C.I. Generic Name is discontinued	<div>AATCC</div> <div>—</div> <div>—</div> <div>—</div> <div>Carbon arc</div> <div>—</div> <div>—</div> <div>3</div> <div>—</div> <div>alkaline</div> <div>5</div> <div>5</div> <div>—</div> <div>—</div> <div>—</div> <div>II</div> <div>5</div> <div>5</div>	<div>AATCC</div> <div>—</div> <div>—</div> <div>—</div> <div>Carbon arc</div> <div>—</div> <div>—</div> <div>3-4</div> <div>—</div> <div>alkaline</div> <div>5</div> <div>5</div> <div>—</div> <div>—</div> <div>—</div> <div>II</div> <div>5</div> <div>5</div>	<div>AATCC</div> <div>III</div> <div>—</div> <div>3</div> <div>Carbon arc</div> <div>5</div> <div>5-6</div> <div>5-6</div> <div>—</div> <div>alkaline</div> <div>5</div> <div>5</div> <div>—</div> <div>—</div> <div>—</div> <div>II</div> <div>5</div> <div>5</div>	<div>AATCC</div> <div>—</div> <div>—</div> <div>—</div> <div>Carbon arc</div> <div>—</div> <div>—</div> <div>3-4</div> <div>—</div> <div>alkaline</div> <div>5</div> <div>5</div> <div>—</div> <div>—</div> <div>—</div> <div>II</div> <div>5</div> <div>5</div>	<div>AATCC</div> <div>—</div> <div>—</div> <div>—</div> <div>Carbon arc</div> <div>—</div> <div>—</div> <div>3-4</div> <div>—</div> <div>alkaline</div> <div>5</div> <div>5</div> <div>—</div> <div>—</div> <div>—</div> <div>II</div> <div>5</div> <div>5</div>	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
						OTHER USES Textile Non-Textile
	*Develop with 1. C.I. Developer 8 (B.O.N.A) 2. C.I. Azoic Coupling Component 18			*Develop with 1. C.I. Developer 8 (B.O.N.A.) 2. C.I. Azoic Coupling Component 18		NOTES

C.I. Disperse Blue 49—54

C.I. Disperse Blue	49		50	51		
CHEMICAL CLASS	—			Anthraquinone		
C.I. CONSTITUTION NO.	—			—		
SUBSTRATE	ACETATE	NYLON		ACETATE	TRIACETATE	POLYESTER
HUE	Blue	Blue		Greenish Blue	—	—
Artificial Light (tungsten)	duller	—		—	—	—
DYEING						
Methods	N	N		N	N	HT
Dyeing Properties						
Rate	—	—		—	—	—
Temp. range	—	90–95°C		poor	—	—
Levelling	—	—		—	—	—
Build-up	—	—		good	—	—
Reservation cotton	—	—		5	—	—
viscose	4	—		—	—	—
wool	—	—		4	—	—
PRINTING						
Fixation	—	—	This C.I. Generic Name is discontinued	AS	—	PS
Dischargeability	—	—		x	—	x
FASTNESS						
Test Methods	AATCC	AATCC		AATCC	AATCC	AATCC
Dry Heat	—	I		—	—	—
conditions	—	—		—	—	—
change	—	5		—	—	—
staining	—	—		—	—	—
Light	Carbon arc	Carbon arc		Carbon arc	Carbon arc	Carbon arc
source	6	4		5–6	6	—
pale	6	4		6	6	5
medium	—	—		6	6	5
heavy	—	—		—	—	—
Nitrogen Oxides	—	—		3–4	3–4	2
Perspiration	alkaline	alkaline		alkaline	alkaline	alkaline
acid/alk.	5	5		5	5	4–5
change	5	5		—	—	—
staining	—	—		—	—	—
Pleating (steam)	—	—		—	—	—
conditions	—	—		—	—	—
change	—	—		—	—	—
staining	—	—		—	—	—
Washing	II	III		I	I	III
conditions	5	5		4	4	4–5
change	5	5		4	4	5
staining	—	—		—	—	—
OTHER USES				Nylon: printing		
Textile						
Non-Textile						
NOTES						

52	53	54			C.I. Disperse Blue
Anthraquinone — ACETATE Blue greener	Anthraquinone — ACETATE Dull Blue redder	Anthraquinone — ACETATE Blue little greener			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
		TRIACETATE Blue little greener	POLYESTER Blue little greener		
N rapid very good good good 4 4 1-2 AS ×	N — — — — — 4 — AS ×	N — — — — 5 5 4 AS ×	N — — — — 5 5 4 PS ×	Nc, HT, T rapid — — good 5 5 4 PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC — — — Carbon arc 4 4-5 5 2 alkaline 4-5 3-4 — — — II 4-5 3-4	AATCC — — — Carbon arc — 6 — — alkaline 5 5 — — — I 5 5	ISO — — — daylight 5 6 6-7 4 alkaline 4-5 5 — — — ISO 2 4 4	ISO intermediate 4-5 4-5 daylight 5 5-6 6 4 alkaline 4-5 5 — — — ISO 3 4-5 5	ISO intermediate 4-5 4 daylight 7 7 — — alkaline 5 5 — — — ISO 3 4-5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
Nylon: hue, blue; light (AATCC), 4-5					OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Blue 55, 56

C.I. Disperse Blue	55		
CHEMICAL CLASS	Anthraquinone		
C.I. CONSTITUTION NO.	—		
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER
HUE	Dull Blue	Dull Blue	Dull Blue
Artificial Light (tungsten)	little redder	little redder	little redder
DYEING			
Methods	N	Nc, HT	Nc, HT, T
Dyeing Properties			
Rate	—	—	—
Temp. range	—	—	—
Levelling	—	—	—
Build-up	—	—	—
Reservation			
cotton	—	—	4
viscose	—	—	4
wool	—	—	3
PRINTING			
Fixation	AS	PS	PS
Dischargeability	x	x	x
FASTNESS			
Test Methods	ISO	ISO	ISO
Dry Heat		intermediate	intermediate
conditions	—	4-5	4
change	—	4-5	3
staining	—		
Light		daylight	daylight
source	daylight	4-5	6
pale	3	5	6-7
medium	4	5-6	—
heavy	4-5		
Nitrogen Oxides	2-3	3-4	—
Perspiration		alkaline	alkaline
acid/alk.	alkaline	4-5	5
change	4-5	4-5	5
staining	3-4		
Pleating		—	—
(steam)	—	—	—
conditions	—	—	—
change	—		
staining	—		
Washing		ISO 3	ISO 3
conditions	ISO 1	4-5	4-5
change	4-5	4	5
staining	3-4		
OTHER USES			
Textile	Nylon: (ISO); Light, 4, 4-5, 5; Perspiration, 4-5, 3-4		
	Acrylic: (ISO), Light, 5-6, 6, 6; Perspiration, 5, 5		
Non-Textile			
NOTES			

Anthraquinone

ACETATE

Blue
redder

NYLON

Blue
redder

TRIACETATE

Blue
redder

POLYESTER

Blue
redder

ACRYLIC

Blue
redder

CHEMICAL CLASS

C.I. CONSTITUTION NO.

SUBSTRATE

HUE

Artificial Light (tungsten)

N

N

Nc

Nc, HT, (T)

N

D—slow
D—moderate
C—good
C—goodslow
moderate
moderate
goodD—slow
D—moderate
C—good
C—goodNc HT
— —
— —
— mod.
mod. good—
—
—
—3
2-3
23-4
4-5
33
3
23
3
2—
—
—AS
xAS
xPS, (AS)
xPS, (ASc)
x—
—DYEING
MethodsDyeing Properties
Rate
Temp. range
Levelling
Build-upReservation cotton
viscose
wool

PRINTING

Fixation
Dischargeability

ISO AATCC

— —
— —
— —

ISO AATCC

inter. —
4-5 —
3 —

ISO AATCC

inter. —
4-5 —
4 —

ISO AATCC

inter. II
4-5 4-5
3-4 4-5

ISO AATCC

mild —
5 —
5 —

FASTNESS

Test Methods

Dry Heat conditions
change
stainingdaylight C.arc
5-6 —
6 5-6
6 —daylight C.arc
4-5 —
5-6 5
6 —daylight C.arc
4-5 —
6 4-5
6-7 —daylight C.arc
6-7 5-6
7 5-6
7 —daylight C.arc
6-7 7
6-7 —
— —Light source
pale
medium
heavy

3-4 —

4-5 —

4 —

4-5 —

5 —

Nitrogen Oxides

alk. —
5 —
3 —alk. —
5 —
4 —alk. —
5 —
4 —alk. alk.
5 4-5
4-5 5alk. —
4-5 —
4-5 —Perspiration acid/alk.
change
staining— —
— —
— —inter. —
5 —
4-5 —inter. —
5 —
4 —inter. —
5 —
5 —— —
— —
— —Pleating conditions
(steam) change
stainingISO 2 IIA
5 4
3 1-2ISO 1 IIA
4-5 4-5
3-4 1ISO 3 IIA
4 4-5
3 —ISO 4 III
4-5 4-5
3-4 4-5ISO 3 IIA
5 5
5 5Washing conditions
change
staining

OTHER USES

Textile

Non-Textile

May give anomalous light fastness results in admixture with certain azo yellows and reds

NOTES

C.I. Disperse Blue 57—63

C.I. Disperse Blue	57	58			59
CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)		Aminonaphthoquinone — ACETATE TRIACETATE POLYESTER Bright Blue Bright Blue Bright Blue little duller little duller greener, duller			
DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability	This C.I. Generic Name is discontinued	N B—rapid B—very good C—good D—moderate — 3-4 1 AS ×	Nc, HT C—moderate — — D—moderate — — — PS ×	Nc, HT, (T*) — — — — — — — PS ×	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 56
FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining		ISO mild 5 5 daylight 5 6 6-7 3 alkaline 4 2-3 — — — ISO 1 3-4 3	ISO intermediate 5 4-5 daylight 4-5 5-6 6 3-4 alkaline 4-5 3 intermediate 4-5 4 ISO 3 4 3-4	ISO intermediate 4-5 3-4 daylight 6 6-7 6-7 4-5 alkaline 5 5 intermediate 4-5 4-5 ISO 4 4-5 4	
OTHER USES Textile Non-Textile		Wool Sheepskins: light (ISO), 3-4			
NOTES		Should be dyed at pH 5.5-6.0 Not recommended for goods requiring a permanent press finish Similar to C.I. Disperse Blue 20 *Pale to medium depths only			

60			61	62	63	C.I. Disperse Blue
Anthraquinone —			Anthraquinone —	Anthraquinone —	Anthraquinone —	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Bright Greenish Blue greener, duller	TRIACETATE Bright Greenish Blue greener, duller	POLYESTER Bright Greenish Blue greener, duller	POLYESTER Bright Greenish Blue greener	POLYESTER Dull Greenish Blue greener, duller	POLYESTER Blue little redder	
N	Nc, HT	Nc, HT, T	HT, T, (Nc)	HT	Nc, HT	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool
—	—	—	—	—	—	
—	—	—	—	—	—	
poor	good	good	—	—	—	
—	—	—	—	—	—	
—	—	—	—	—	—	
—	—	—	—	—	4	
AS x	PS x	PS x	PS x	PS x	PS x	PRINTING Fixation Dischargeability
ISO mild 5 5	ISO intermediate 4-5 4	ISO AATCC inter. — 4-5 — 3-4 —	AATCC II 5 5	AATCC — — —	AATCC — — —	FASTNESS Test Methods Dry Heat conditions change staining
daylight 7 — —	daylight 6-7 7 7	day. C. arc 7 — 7 7-8 7 —	Carbon arc 8 8 8	Carbon arc — 6-7 —	Carbon arc — 3-4 —	Light source pale medium heavy
2	2-3	— 4-5	5	4-5	4-5	Nitrogen Oxides
alkaline 5 4	alkaline 5 4-5	alk. alk. 5 4-5 5 5	alkaline 5 5	alkaline 5 5	alkaline 4-5 5	Perspiration acid/alk. change staining
mild 5 5	intermediate 5 5	inter. — 4-5 — 5 —	intermediate 4-5 5	— — —	— — —	Pleating (steam) conditions change staining
ISO 2 4 4	ISO 3 4-5 4	ISO 4 IIIA 4-5 4-5 4-5 5	III 4-5 5	IIIA 4-5 5	IIIA 4-5 4-5	Washing conditions change staining
			Acetate: prints, Light, 6-7	Triacetate		OTHER USES Textile Non-Textile
Acetate: build-up better on printing than dyeing					Good wool reserve	NOTES

C.I. Disperse Blue 64—71

C.I. Disperse Blue	64	64:1	65	66	67	68
CHEMICAL CLASS	Anthraquinone	Similar in hue and properties to C.I. Disperse Blue 64 but slightly different chemically	Anthraquinone	Anthraquinone	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Acid Blue 230	Anthraquinone
C.I. CONSTITUTION NO.	—		—	—		—
SUBSTRATE	POLYESTER		POLYESTER	ACETATE		ACETATE
HUE	Reddish Blue		Blue	Bright Reddish Blue		Bright Reddish Blue
Artificial Light (tungsten)	redder		redder, duller	redder, duller		greener, duller
DYEING						
Methods	Nc, HT		Nc, HT	N		N
Dyeing Properties						
Rate	moderate		—	—		—
Temp. range	—		—	moderate		poor
Levelling	—		—	—		good
Build-up	very good		—	good*		good
Reservation	cotton		—	—		—
viscose	4		—	—		—
wool	4		—	—		—
PRINTING						
Fixation	PS		PS	not suitable		not suitable
Dischargeability	x		x	—		—
FASTNESS						
Test Methods	AATCC		AATCC	AATCC		AATCC
Dry Heat	conditions		—	—		—
change	—		—	—		—
staining	—		—	—		—
Light	source		Carbon arc	Carbon arc		Carbon arc
pale	Carbon arc		4	—		—
medium	4		—	4-5		4-5
heavy	—		—	—		—
Nitrogen Oxides	5		3-4	1-2		1
Perspiration	acid/alk.		alkaline	—		—
change	5		4-5	4-5		4
staining	5		5	4-5		4
Pleating	conditions		—	—		—
(steam)	change		—	—		—
staining	—		—	—		—
Washing	conditions		IIIA	IIA		IIA
change	5		4-5	4		3
staining	5		4-5	4		—
OTHER USES						
Textile	Acetate		Acetate, Nylon,	Nylon		Nylon
	Nylon		Triacetate	Acrylic		
Non-Textile						
NOTES			Not suitable for unions of wool/polyester			

69	70			71	C.I. Disperse Blue
	Anthraquinone — ACETATE TRIACETATE POLYESTER Blue Blue Blue — — —				CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 56	N slow poor — good — — 1-2 — —	Nc — — — — — — — PS x	Nc, HT, T — — — — — — — PS x	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 56	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	AATCC — — — Carbon arc 6 — 4 — — — — — 4 —	AATCC — — — Carbon arc 6 — 4 — — — — — 4 —	AATCC — — — Carbon arc 6 — — — — — — 4 —		FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
	Nylon: hue, dull blue				OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Blue 72—78

C.I. Disperse Blue		72		73			
CHEMICAL CLASS		Anthraquinone		Anthraquinone			
C.I. CONSTITUTION NO.		—		—			
SUBSTRATE		TRIACETATE	POLYESTER	ACETATE	TRIACETATE	POLYESTER	
HUE		Bluish Violet	Reddish Blue	Bright Blue	Bright Blue	Bright Blue	
Artificial Light (tungsten)		much redder	redder	little duller	little duller	little greener	
DYEING							
Methods		Nc	Nc, HT	N	Nc, HT, T	Nc, HT, T	
Dyeing Properties			HT				
Rate		D—slow	—	—	—	—	
Temp. range		E—poor	—	—	—	—	
Levelling		D—moderate	poor	—	—	—	
Build-up		C—good	good	moderate	good	good	
Reservation		cotton	3-4	—	—	3	
		viscose	3	—	—	3	
		wool	2	—	—	2	
PRINTING							
Fixation		PS	PS	AS	PS	PS	
Dischargeability		×	×	×	×	×	
FASTNESS							
Test Methods		ISO	ISO	ISO	AATCC	ISO	AATCC
Dry Heat		intermediate	intermediate	—	—	inter.	III
conditions		4-5	4-5	—	—	4-5	—
change		3-4	3	—	—	4-5	4-5
staining							
Light		daylight	daylight	daylight	daylight	daylight	daylight
source		6	6-7	4	—	5-6	—
pale		6-7	6-7	5-6	7-8	6	6
medium		—	6-7	6	—	6-7	—
heavy							
Nitrogen Oxides		4	4	3	2-3	3	3
Perspiration		alkaline	alkaline	alk.	alk.	alk.	alk.
acid/alk.		5	5	4-5	4-5	4-5	5
change		4-5	5	4-5	—	4-5	—
staining							
Pleating		intermediate	intermediate	—	—	—	—
(steam)		5	5	—	—	—	—
change		4-5	4-5	—	—	—	—
staining							
Washing		ISO 3	ISO 4	ISO 1	II	ISO 3	II
conditions		5	5	4-5	4-5	4-5	4-5
change		4-5	4	4	4-5	4	5
staining							
OTHER USES							
Textile		Acetate: suitable for printing					
Non-Textile							
NOTES		Suitable for fabrics to be rubber proofed					

74	75	76		77	78	C.I. Disperse Blue
	— — POLYESTER Navy —	Anthraquinone — ACETATE Blue greener		Anthraquinone — POLYESTER Dull Blue duller		CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
This C.I. Generic Name is discontinued	(Nc), HT — — — 5 5 3 PS —	N moderate good good — — — AS ×	N — — — — — — AS ×	(Nc), HT, T — — — — 4-5 4-5 3-4 PS ×	This C.I. Generic Name is discontinued	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	ISO — — — daylight — — 6-7 5 alkaline 5 5 intermediate 5 5 ISO 3 5 5	ISO — — — daylight — 6-7 — — alkaline 5 5 — — — ISO 1 4-5 4-5	ISO — — — daylight — 6-7 — — alkaline 4-5 4-5 — — — ISO 1 4-5 4-5	ISO inter. 5 4 daylight 6 6-7 7 — alkaline 5 5 severe 5 5 ISO 4 5 4		AATCC III — 4 C. arc 5 6 — — alkaline 5 5 — — — III 4-5 4-5 OTHER USES Textile Non-Textile NOTES

C.I. Disperse Blue 79—81:1

C.I. Disperse Blue		79		80			
CHEMICAL CLASS		Monoazo		Anthraquinone			
C.I. CONSTITUTION NO.							
SUBSTRATE		TRIACETATE	POLYESTER	ACETATE	NYLON	TRIACETATE	ACRYLIC
HUE		Reddish Navy	Navy	Bright Blue	Blue	Bright Blue	Blue
Artificial Light (tungsten)		redder	duller	duller, greener	duller, greener	duller, greener	duller, greener
DYEING							
Methods		HT, T	(Nc), HT, T	N	N	N, HT	N
Dyeing Properties							
Rate		—	—	moderate	—	—	—
Temp. range		—	—	moderate	—	—	—
Levelling		—	—	—	—	—	—
Build-up		—	—	good	—	good	—
Reservation	cotton	—	4	4	—	—	—
	viscose	—	4	4	—	—	—
	wool	—	2	1-2	—	—	—
PRINTING							
Fixation		—	PS	AS	AS	PS	PS
Dischargeability		—	—	x	x	x	x
FASTNESS							
Test Methods		ISO	ISO AATCC	ISO	ISO	ISO	ISO
Dry Heat	conditions	severe	inter. III	—	—	intermediate	intermediate
	change	5	5	—	—	5	3
	staining	4	4 4-5	—	—	4-5	3
Light	source	daylight	day. day.	daylight	daylight	daylight	daylight
	pale	—	—	3	4	2-3	6
	medium	—	—	3-4	4-5	3	6-7
	heavy	6	6-7 6-7	5	—	3-4	6-7
Nitrogen Oxides		5	5 5	2	—	2-3	—
Perspiration	acid/alk.	alkaline	alk. alk.	alkaline	alkaline	alkaline	alkaline
	change	4-5	5	4-5	4-5	5	4-5
	staining	5	4-5 4	2-3	2-3	3	4-5
Pleating (steam)	conditions	severe	severe	—	—	intermediate	—
	change	4-5	5	—	—	5	—
	staining	4-5	4-5	—	—	2	—
Washing	conditions	ISO 3	ISO 3 III	ISO 1	ISO 3	ISO 3	ISO 3
	change	4	5 4	4	3	4-5	4-5
	staining	5	4-5 4	3	2	3-4	5
OTHER USES							
Textile							
Non-Textile							
NOTES							

81						81:1	C.I. Disperse Blue
Anthraquinone						Very similar in hue, properties and usage to C.I. Disperse Blue 81 but slightly different chemically	CHEMICAL CLASS
							C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC			SUBSTRATE
Dull Blue	Blue	Dull Blue	Dull Blue	Blue			HUE
little redder	—	redder	little redder	—			Artificial Light (tungsten)
N	—	Nc, HT	Nc, HT	—			DYEING
—	—	—	—	—			Methods
poor	poor	poor	—	—			Dyeing Properties
good	good	very good	very good	—			Rate
—	—	—	—	—			Temp. range
—	—	—	—	—			Levelling
—	—	—	—	—			Build-up
AS	AS	PS	PS	PS			Reservation cotton
x	x	x	x	x		viscose	
						wool	
						PRINTING	
						Fixation	
						Dischargeability	
ISO	ISO	ISO	ISO	AATCC	ISO	FASTNESS	
—	intermediate	intermediate	inter.	III	intermediate	Test Methods	
—	4-5	4-5	4-5	5	4-5	Dry Heat	
—	3	4-5	3-4	3	3-4	conditions	
daylight	daylight	daylight	day.	C. arc	daylight	change	
4	4-5	4	5-6	5	5-6	staining	
4	5	4-5	6	5	5-6	Light	
5	5-6	5	6-7	5-6	6	source	
3	3-4	3-4	—	—	5	pale	
alkaline	alkaline	alkaline	alk.	alk.	alkaline	medium	
4-5	4-5	4-5	4-5	5	5	heavy	
3-4	3-4	4-5	4-5	5	5	Nitrogen Oxides	
—	—	—	—	—	—	Perspiration	
—	—	—	—	—	—	acid/alk.	
—	—	—	—	—	—	change	
ISO 1	ISO 1	ISO 3	ISO 4	III	ISO 3	staining	
4	4-5	4-5	4-5	5	5	Pleating	
3	3-4	4-5	4	5	5	(steam)	
						conditions	
						change	
						staining	
						Washing	
						conditions	
						change	
						staining	
						OTHER USES	
						Textile	
						Non-Textile	
						NOTES	

C.I. Disperse Blue 82, 83

C.I. Disperse Blue	82		
CHEMICAL CLASS	Monoazo		
C.I. CONSTITUTION NO.	—		
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER
HUE	Blue	Reddish Blue	Reddish Blue
Artificial Light (tungsten)	redder, weaker	much redder	much redder
DYEING			
Methods	N	N	Nc, HT
Dyeing Properties			HT
Rate	A—very rapid	A—very rapid	—
Temp. range	D—moderate	C—good	—
Levelling	D—moderate	D—moderate	good
Build-up	B—very good	A—excellent	good
Reservation			
cotton	2-3	3-4	3
viscose	3	3	3
wool	1	1	1
PRINTING			
Fixation	AS	PS	PS
Dischargeability	✓	✓	✓
FASTNESS			
Test Methods	ISO	ISO	ISO
Dry Heat	—	intermediate	intermediate
conditions	—	5	4-5
change	—	4	4
staining	—	—	—
Light	daylight	daylight	daylight
source	4-5	4-5	5
pale	4-5	4	5
medium	4-5	4	5
heavy	—	—	—
Nitrogen Oxides	5	5	—
Perspiration	alkaline	alkaline	alkaline
acid/alk.	4-5	4	5
change	3	4	5
staining	—	—	—
Pleating	—	severe	intermediate
(steam)	—	4-5	4-5
change	—	4-5	4-5
staining	—	—	—
Washing	ISO 3	ISO 3	ISO 4
conditions	4	4	5
change	4-5	5	5
staining	—	—	—
OTHER USES			
Textile			
Non-Textile			
NOTES			

83				C.I. Disperse Blue
Anthraquinone				CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	C.I. CONSTITUTION NO.
Bright Blue	Greenish Blue	Bright Blue	Blue	SUBSTRATE
duller	duller	duller	redder, duller	HUE
				Artificial Light (tungsten)
N	N	Nc, HT	Nc, HT	DYEING
				Methods
E—very slow	slow	E—very slow	HT .	Dyeing Properties
E—poor	poor	E—poor	—	Rate
D—moderate	poor	E—poor	—	Temp. range
C—good	moderate	D—moderate	poor	Levelling
			good	Build-up
3	3-4	3	—	Reservation
3	4-5	4	—	cotton
2	2	2	—	viscose
				wool
—	—	—	PS	PRINTING
×	×	×	×	Fixation
				Dischargeability
ISO	ISO	ISO	ISO	FASTNESS
—	intermediate	severe	severe	Test Methods
—	5	5	5	Dry Heat
—	5	3-4	4	conditions
daylight	daylight	daylight	daylight	change
6	5	4-5	6-7	staining
6	5-6	—	6-7	Light
—	—	—	6-7	source
3	—	3-4	—	pale
alkaline	alkaline	alkaline	alkaline	medium
5	5	5	5	heavy
4	4-5	4-5	5	Nitrogen Oxides
—	severe	severe	intermediate	Perspiration
—	5	5	5	acid/alk.
—	4-5	3-4	5	change
ISO 3	ISO 2	ISO 3	ISO 4	staining
5	5	4	5	Pleating
4	3-4	4-5	5	(steam)
				conditions
				change
				staining
				Washing
				conditions
				change
				staining
				OTHER USES
				Textile
				Non-Textile
				NOTES

C.I. Disperse Blue 84—89

C.I. Disperse Blue	84			85	86
CHEMICAL CLASS	Anthraquinone			Monoazo	Anthraquinone
C.I. CONSTITUTION NO.	—			—	—
SUBSTRATE	TRIACETATE	POLYESTER	ACRYLIC	POLYESTER	POLYESTER
HUE	Bright Blue	Bright Blue	Bright Blue	Reddish Navy	Blue
Artificial Light (tungsten)	redder	redder	redder	redder, duller	—
DYEING					
Methods	N, HT	Nc, HT	N	HT†, T, (Nc)	Nc, HT
Dyeing Properties					
Rate	—	—	—	—	slow
Temp. range	—	—	—	—	moderate
Levelling	—	—	—	—	—
Build-up	very good	very good	good	—	good
Reservation					
cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	4	—
PRINTING					
Fixation	PS	PS	PS	PS	PS
Dischargeability	x	x	x	—	x
FASTNESS					
Test Methods					
Dry Heat	conditions	ISO	ISO	ISO	ISO
change	intermediate	intermediate	mild	intermediate	—
staining	4-5	5	5	5	—
	3	3-4	4-5	4-5	—
Light	source	daylight	daylight	daylight*	daylight
pale	5	6-7	5-6	—	5-6
medium	5-6	6-7	6	5	6
heavy	6	6-7	6	5	6-7
Nitrogen Oxides	5	3	5	—	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	5
staining	4	5	5	5	5
Pleating	conditions	intermediate	severe	intermediate	severe
(steam)	change	5	5	5	5
staining	5	4-5	5	5	—
Washing	conditions	ISO 2	ISO 4	ISO 2	ISO 4
change	3-4	5	5	5	5
staining	4	3-4	5	4-5	5
OTHER USES					
Textile	Acetate: Light, 5, 6, 6; wet fastness—average				Nylon: Light fast-
Non-Textile	Nylon: Light, 4, 4-5, 4-5; wet fastness—average				ness—poor
NOTES				†Prolonged HT dye- ing can cause re- duction of dye in dyebath *Testing by xenon arc gives anomalous results	

87			88	89		C.I. Disperse Blue
Anthraquinone			Azo	Anthraquinone		CHEMICAL CLASS
ACETATE	TRIACETATE	POLYESTER	ACETATE	ACETATE	POLYESTER	C.I. CONSTITUTION NO.
Bright Blue	Bright Blue	Bright Greenish Blue	Bluish Violet	Bright Blue	Bright Blue	SUBSTRATE
Little greener	duller	duller, greener	—	—	little change	HUE
						Artificial Light (tungsten)
N	Nc, HT, T	Nc, HT, T	—	N	Nc, HT	DYEING
—	—	Nc HT	—	—	—	Methods
—	—	— —	—	—	—	Dyeing Properties
—	—	— poor	—	—	—	Rate
—	—	poor mod.	—	—	—	Temp. range
—	—	4	—	—	4	Levelling
—	—	4	—	—	4	Build-up
—	—	1-2	—	—	—	Reservation cotton
AS	PS	AS	AS	—	—	viscose
x	x	x	✓	—	—	wool
						PRINTING
						Fixation
						Dischargeability
ISO	ISO	ISO	AATCC	AATCC	AATCC	FASTNESS
—	intermediate	intermediate	—	—	III	Test Methods
—	4-5	5	—	—	—	Dry Heat conditions
—	5	4	—	—	3-4	change
daylight	daylight	daylight	Carbon arc	Xenon arc	Carbon arc	staining
6	6	6-7	—	—	5-6	Light source
6	6-7	7	4	5	6	pale
6-7	7	7	—	—	6-7	medium
3-4	4	4-5	5	—	—	heavy
alkaline	alkaline	alkaline	alkaline	alkaline	alkaline	Nitrogen Oxides
4-5	4-5	5	5	4-5	5	Perspiration acid/alk.
4-5	4-5	5	5	4-5	5	change
—	intermediate	intermediate	—	—	—	staining
—	5	5	—	—	—	Pleating conditions
—	4-5	5	—	—	—	(steam) change
ISO 1	ISO 3	ISO 4	I	I	II	staining
5	4-5	4-5	4-5	4-5	5	Washing conditions
4-5	5	4-5	4	4-5	5	change
						staining
Nylon: (ISO) Light, 4; Perspiration, 4, 4						OTHER USES
						Textile
						Non-Textile
						NOTES

C.I. Disperse Blue 90—94

C.I. Disperse Blue	90		91		92	
CHEMICAL CLASS	Anthraquinone		Anthraquinone		Azo	
C.I. CONSTITUTION NO.	—		—		—	
SUBSTRATE	ACETATE	POLYESTER	ACETATE	POLYESTER	ACETATE	POLYESTER
HUE	Blue	Blue	Blue	Blue	Reddish Blue	Reddish Blue
Artificial Light (tungsten)	—	little duller	—	little duller	—	much redder
DYEING	N		N		N	
Methods	Nc, HT		Nc, HT		Nc, HT	
Dyeing Properties	—		—		—	
Rate	—		—		—	
Temp. range	—		—		—	
Levelling	—		—		—	
Build-up	—		—		—	
Reservation	—		—		—	
cotton	4		4		4	
viscose	4		4		4	
wool	—		—		—	
PRINTING	—		—		—	
Fixation	—		—		—	
Dischargeability	—		—		—	
FASTNESS	AATCC		AATCC		AATCC	
Test Methods	—		—		—	
Dry Heat	—		—		—	
conditions	III		III		III	
change	—		—		—	
staining	2-3		3		3	
Light	Xenon arc		xenon arc		Xenon arc	
source	Carbon arc		Carbon arc		Carbon arc	
pale	5-6		5-6		3	
medium	6		5		4-5	
heavy	6		—		—	
Nitrogen Oxides	—		—		4	
Perspiration	alkaline		alkaline		alkaline	
acid/alk.	5		4-5		4-5	
change	5		4-5		4-5	
staining	—		—		—	
Pleating	—		—		—	
(steam)	—		—		—	
change	—		—		—	
staining	—		—		—	
Washing	I		I		I	
conditions	II		II		II	
change	5		4-5		4-5	
staining	5		4-5		4-5	
OTHER USES						
Textile						
Non-Textile						
NOTES						

93	94			C.I. Disperse Blue
Anthraquinone — NYLON Bright Blue redder	Monoazo — ACETATE TRIACETATE POLYESTER Navy Reddish Navy Reddish Navy little redder much redder redder			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
N — 95–98°C — — — — AS ×	N — — — — — — —	Nc, HT, T — — — — — — —	HT, T — — — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
ISO — — — daylight 6–7 6–7 6–7 — alkaline 4–5 4–5 — — — ISO 3 3–4 3	ISO — — — — — — 5 alkaline 4–5 4 — — — ISO 1 5 5	ISO — — — — — — 4–5 alkaline 4–5 4–5 — — — ISO 3 5 5	ISO severe 4 4 daylight 5 5–6 6–7 — alkaline 4–5 4–5 severe 3–4 4–5 ISO 3 4–5 4–5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
	Nylon Acetate: printing			OTHER USES Textile Non-Textile
				NOTES

C.I. Disperse Blue 95—99

C.I. Disperse Blue		95				96
CHEMICAL CLASS		Anthraquinone				Monoazo
C.I. CONSTITUTION NO.		—				—
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE
HUE		Bright Blue	Blue	Bright Blue	Blue	Blue
Artificial Light (tungsten)		redder, duller	duller	redder, duller	greener	redder
DYEING						
Methods		N	N	(N), HT	Nc, HT (T—190°C)	N
Dyeing Properties						
Rate		—	—	—	—	moderate
Temp. range		—	—	—	—	very good
Levelling		—	—	—	—	good
Build-up		—	—	—	—	good
Reservation	cotton	—	—	4	4	4
	viscose	—	—	4	4	4
	wool	—	—	1-2	1-2	2
PRINTING						
Fixation		AS	AS	PS	PS	AS
Dischargeability		x	x	x	x	✓
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	AATCC
Dry Heat	conditions	—	intermediate	intermediate	intermediate	—
	change	—	4	4-5	4-5	—
	staining	—	2-3	4	3-4	—
Light	source	daylight	daylight	daylight	daylight	Carbon arc
	pale	4	5	4-5	6	3-4
	medium	4	5	5	5-6	3-4
	heavy	4-5	5-6	5-6	5-6	4
Nitrogen Oxides		3-4	5	4	5	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	—
	change	5	5	4-5	5	—
	staining	3-4	4	3-4	5	—
Pleating (steam)	conditions	—	intermediate	intermediate	severe	—
	change	—	4-5	5	5	—
	staining	—	4-5	4-5	4-5	—
Washing	conditions	ISO 1	ISO 1	ISO 3	ISO 4	II
	change	5	4	4-5	4-5	4-5
	staining	2-3	2	3	3-4	4
OTHER USES						
Textile						
Non-Textile						
NOTES		Stable between pH 4 and 8				

97		98		99	C.I. Disperse Blue
Anthraquinone		Anthraquinone		Anthraquinone	CHEMICAL CLASS
ACETATE	POLYESTER	ACETATE	POLYESTER	POLYESTER	C.I. CONSTITUTION NO.
Blue	Blue	Greenish Blue	Greenish Blue	Greenish Blue	SUBSTRATE
redder	redder	redder	redder	little redder	HUE
					Artificial Light (tungsten)
N	Nc, HT	N	Nc, HT	Nc, HT	DYEING
					Methods
moderate	rapid	very slow	moderate	moderate	Dyeing Properties
poor	good	poor	—	moderate	Rate
—	—	—	—	—	Temp. range
good	good	poor	good	good	Levelling
—	5	—	4	5	Build-up
—	5	—	4	5	Reservation
—	4	—	2	3	cotton
AS	PS	AS	PS	PS	viscose
x	x	x	x	x	wool
					PRINTING
					Fixation
					Dischargeability
AATCC	AATCC	AATCC	AATCC	AATCC	FASTNESS
—	III	—	III	III	Test Methods
—	5	—	5	5	Dry Heat
—	3	—	4-5	4-5	conditions
Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc	change
5-6	5-6	5-6	7-8	6-7	staining
5-6	5-6	—	7-8	7	Light
5-6	5-6	—	7	7	source
3-4	—	—	—	—	pale
—	—	—	—	—	medium
—	—	—	—	—	heavy
—	—	—	—	—	Nitrogen Oxides
—	—	—	—	—	Perspiration
—	—	—	—	—	acid/alk.
—	—	—	—	—	change
—	—	—	—	—	staining
—	—	—	—	—	Pleating
—	—	—	—	—	(steam)
—	—	—	—	—	conditions
I	III	I	III	III	change
5	5	4-5	5	4-5	staining
5	5	4-5	5	5	Washing
					conditions
					change
					staining
Nylon		Nylon: high temperature dyeing on printing			OTHER USES
					Textile
					Non-Textile
		Primarily for polyesters but suitable for pale depths on acetate and nylon			NOTES

C.I. Disperse Blue 100—106

C.I. Disperse Blue	100		101	102	
CHEMICAL CLASS	Monoazo		Azo	Monoazo	
C.I. CONSTITUTION NO.	—		—	—	
SUBSTRATE	ACETATE	POLYESTER	ACETATE	ACETATE	TRIACETATE
HUE	Blue	Blue	Blue	Blue	Reddish Blue
Artificial Light (tungsten)	redder	redder	duller	duller	much redder
DYEING					
Methods	N	Nc, HT	N	N	Nc
Dyeing Properties					
Rate	moderate	moderate	moderate	C—moderate	slow
Temp. range	poor	moderate	good	D—moderate	—
Levelling	good	good	—	C—good	—
Build-up	good	good	good	B—very good	good
Reservation					
cotton	—	4-5	—	—	—
viscose	—	4-5	3-4	3-4	—
wool	—	2	—	2	—
PRINTING					
Fixation	—	—	AS	—	—
Dischargeability	✓	✓	✓	✓	✓
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	ISO AATCC	ISO
Dry Heat	—	—	—	—	severe
conditions	—	—	—	—	5
change	—	—	—	—	4
staining	—	—	—	—	—
Light	Carbon arc	Carbon arc	Carbon arc	day. C.arc	daylight
source	—	—	—	4 2	3-4
pale	3-4	3	4	4-5 3-4	4
medium	—	—	—	4-5 —	4
heavy	—	—	—	—	—
Nitrogen Oxides	5	—	5	5 5	5
Perspiration	acid/alk.	—	alkaline	alk. alk.	alkaline
change	—	—	4	5 4-5	5
staining	—	—	3	3-4 3-4	4-5
Pleating	conditions	—	—	—	severe
(steam)	change	—	—	—	5
staining	—	—	—	—	4
Washing	conditions	III	I	ISO 2 II	ISO 3
change	4-5	5	3-4	4-5 4	4-5
staining	4-5	5	4	4-5 4	4
OTHER USES					
Textile			Nylon: (AATCC) Light, 1; Wash II, 3, 3-4	Nylon: (AATCC) Light, 1; Wash II, 3, 5	
Non-Textile				Wool Sheepskins: (ISO) Light, 2-3	
NOTES	Suitable as ground for discharge printing		Suitable for discharge- able grounds	Suitable for dischargeable grounds Unstable in alkaline dye liquors	

103	104	105		106	C.I. Disperse Blue
Anthraquinone — POLYESTER Blue little duller	Anthraquinone — POLYESTER Dull Blue little duller	Anthraquinone — ACETATE Blue duller		Azo — POLYESTER Reddish Blue redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
Nc, HT, T — — — — 2-3 — — ×	Nc, HT, T — — — — 2-3 — — ×	N — — — — 1 — AS ×	Nc, HT — — good good — 3 2 — ×	Nc, HT — — — — 5 — — √	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC III — 3-4 Carbon arc 4 4-5 5 — — — — — — — II 5 5	AATCC III — 4 Carbon arc 5-6 6 6-7 — — — — II 5 5	AATCC — — — Carbon arc — 7 — 1 alkaline 4 5 — — — I 4 3	AATCC III — 3-4 Carbon arc 5 5-6 6 — — — — II 5 5	AATCC III — 3-4 Carbon arc — 4 — — — — — II 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating (steam) conditions change staining Washing conditions change staining
		Nylon: (AATCC) Light, 3; Wash II, 4, 4			OTHER USES Textile Non-Textile
					NOTES

C.I. Disperse Blue 107—111

C.I. Disperse Blue	107				
CHEMICAL CLASS C.I. CONSTITUTION NO.	Anthraquinone				
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE	Blue	Blue	Blue	Blue	Blue
Artificial Light (tungsten)	redder	duller	redder	little duller	little redder
DYEING Methods	N	N	N, HT	Nc, HT	N
Dyeing Properties Rate Temp. range Levelling Build-up	C—moderate C—good D—moderate B—very good	moderate moderate moderate good	B—rapid C—good D—moderate B—very good	rapid good moderate very good	moderate moderate good moderate
Reservation cotton viscose wool	— 4-5 2	— 4 2	— 4 2	— 4 2	— 4 2
PRINTING Fixation Dischargeability	AS x	AS x	PS, T x	PS, T x	PS x
FASTNESS	ISO	ISO	ISO	ISO	ISO
Test Methods	—	intermediate	intermediate	intermediate	intermediate
Dry Heat conditions change staining	— —	4 —	4 —	4 —	4 —
Light source pale medium heavy	daylight 4 4-5 4-5	daylight 5 5-6 6	daylight 3-4 4 4	daylight 6 6 6-7	daylight 6 6-7 —
Nitrogen Oxides	3	4	3	5	5
Perspiration acid/alk. change staining	alkaline 4 3	alkaline 4 3	alkaline 4 4	alkaline 5 5	alkaline 5 5
Pleating (steam) conditions change staining	— — —	intermediate 5 4-5	intermediate 5 5	intermediate 5 5	intermediate 5 5
Washing conditions change staining	ISO 2 3-4 3	ISO 2 4 3	ISO 3 4 4	ISO 3 5 5	ISO 3 4-5 5
OTHER USES Textile					
Non-Textile					
NOTES	Sensitive to alkaline dye liquors; dye at pH 5-6				

108		109	110	111	C.I. Disperse Blue
Anthraquinone		Anthraquinone		Anthraquinone	CHEMICAL CLASS
—		—		—	C.I. CONSTITUTION NO.
ACETATE	POLYESTER	POLYESTER		POLYESTER	SUBSTRATE
Bright Green- ish Blue	Bright Green- ish Blue	Blue		Greenish Blue	HUE
—	—	—		duller	Artificial Light (tungsten)
N	Nc, HT	Nc, HT, T		HT, T	DYEING Methods
very slow	moderate	—		—	Dyeing Properties
poor	—	—		—	Rate
—	—	—		—	Temp. range
—	good	—		—	Levelling
—	—	—		—	Build-up
—	3	—		—	Reservation
—	—	—		—	cotton
					viscose
					wool
AS	PS	PS, T	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 14	—	PRINTING
x	x	—		—	Fixation
					Dischargeability
AATCC	AATCC	AATCC		ISO	FASTNESS
—	III	—		intermediate	Test Methods
—	5	—		5	Dry Heat
—	3-4	—		4-5	conditions
Carbon arc	Carbon arc	Carbon arc		daylight	change
—	6	5-6		6-7	staining
5-6	6-7	5-6		6-7	Light
—	6-7	5-6		7	source
4-5	—	5		—	pale
—	—	alkaline		alkaline	medium
—	—	5		5	heavy
—	—	5		5	Nitrogen Oxides
—	—	—		severe	Perspiration
—	—	—		5	acid/alk.
—	—	—		5	change
—	—	—		5	staining
I	III	IIIA		ISO 4	Pleating
4-5	5	4		5	(steam)
4-5	5	4		4-5	conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
		Acetate and Triacetate: by printing			Textile
					Non-Textile
		Sublimation fast- ness—excellent			NOTES

C.I. Disperse Blue 112—116

C.I. Disperse Blue	112				113	114
CHEMICAL CLASS	Anthraquinone				Anthraquinone	Anthraquinone
C.I. CONSTITUTION NO.	—				—	—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	ACRYLIC	POLYESTER	POLYESTER
HUE	Reddish Blue	Blue	Blue	Blue	Reddish Blue	Blue
Artificial Light (tungsten)	redder, duller	greener, duller	redder, duller	greener, duller	duller	greener
DYEING						
Methods	N	N	Nc, HT	N	Nc, HT	Nc, HT, T
Dyeing Properties						
Rate	C—moderate	moderate	—	—	—	moderate
Temp. range	C—good	moderate	—	—	—	—
Levelling	C—good	good	—	—	—	—
Build-up	A—excellent	very good	—	—	—	—
Reservation						
cotton	—	—	—	—	—	2
viscose	3	4	—	—	—	2
wool	2-3	3	—	—	—	2
PRINTING						
Fixation	AS	AS	PS	PS	—	PS
Dischargeability	×	×	×	×	—	×
FASTNESS						
Test Methods	ISO AATCC	ISO AATCC	ISO AATCC	ISO AATCC	ISO AATCC	ISO AATCC
Dry Heat	mild — 4-5 — 4-5 —	inter. V 4-5 — 4 2	inter. V 4-5 — 4-5 4-5	mild — 4-5 — 5	III — — 4-5	intermediate 4-5 4-5
Light	source pale medium heavy	day. C.arc 5 3-4 5-6 4-5 6 4-5	day. C.arc 5 3-4 5-6 4-5 5-6 —	day. C.arc 4 3-4 4 4-5 5 —	daylight 5-6 6 5-6 —	daylight 6 6-7 —
Nitrogen Oxides	1-2 1-2	— 4	2 1-2	—	—	4
Perspiration	acid/alk. change staining	alk. alk. 5 4-5 3 4-5	alk. alk. 5 4-5 2-3 4	alk. alk. 5 4-5 4 4-5	alkaline 4-5 5	alkaline 5 5
Pleating (steam)	conditions change staining	mild — 5 — 4-5 —	inter. — 5 — 5 —	inter. — 5 — 5 —	intermediate 4 5	— — —
Washing	conditions change staining	ISO 2 II 4-5 5 3 4	ISO 2 II 4 4-5 3 3-4	ISO 3 II 4-5 5 4-5 5	II 5 5	ISO 2 4-5 4-5
OTHER USES						
Textile	Polyester: poor light fastness; poor build up					
Non-Textile	Wool Sheepskins: Light (ISO), 3					
NOTES						Suitable for resin finishing

115		116				C.I. Disperse Blue
Anthraquinone		Anthraquinone				CHEMICAL CLASS
—		—				C.I. CONSTITUTION NO.
TRIACETATE	POLYESTER	ACETATE	NYLON	TRIACETATE	POLYPROPYLENE*	SUBSTRATE
Blue	Blue	—	—	—	Reddish Blue	HUE
redder	redder	—	—	—	duller, redder	Artificial Light (tungsten)
Nc, HT	Nc, HT, T	N	N	N		DYEING Methods
—	—					Dyeing Properties
—	—					Rate
—	—					Temp. range
—	—					Levelling
4	4					Build-up
4	4					Reservation
2	2					cotton
						viscose
						wool
PS, T	PS, T					PRINTING
x	x					Fixation
						Dischargeability
ISO severe	ISO severe	AATCC	AATCC	AATCC	AATCC	FASTNESS
4-5	4-5	—	—	—	—	Test Methods
3-4	4	—	—	—	—	Dry Heat
daylight	daylight	C.arc	C.arc	Carbon arc	Carbon arc	conditions
6	6	6-7	6-7	6-7	4-5	change
—	6-7	—	—	—	—	staining
1	—	—	—	—	—	Light
alkaline	alkaline	—	—	—	—	source
5	5	—	—	—	—	pale
5	5	—	—	—	—	medium
—	—	—	—	—	—	heavy
—	—	—	—	—	—	Nitrogen Oxides
—	—	—	—	—	—	Perspiration
ISO 3	ISO 4	I	I	I	I	acid/alk.
5	4-5	5	5	5	5	change
5	3	5	5	5	5	staining
						Pleating
						(steam)
						conditions
						change
						staining
						Washing
						conditions
						change
						staining
		Polyester: (AATCC), light, 3-4; washing I, 5, 5				OTHER USES
						Textile
						Non-Textile
		*Unmodified fibre This dye is of particular interest for polypropylene carpets				NOTES

C.I. Disperse Blue 117—123

C.I. Disperse Blue	117	118	119		
CHEMICAL CLASS	Anthraquinone	Anthraquinone	Anthraquinone		
C.I. CONSTITUTION NO.	—	—	—		
SUBSTRATE	POLYESTER	POLYESTER	ACETATE	TRIACETATE	POLYESTER
HUE	Greenish Blue	Greenish Blue	Greenish Blue	Greenish Blue	Greenish Blue
Artificial Light (tungsten)	little greener	much greener	much greener	much greener	much greener
DYEING					
Methods	Nc, HT, T	Nc, HT, T	N	N, HT, T	Nc, HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation					
cotton	4	4-5	4	4	4
viscose	4	4-5	4	4	4
wool	4	3	2	2	2
PRINTING					
Fixation	PS	PS	—	—	—
Dischargeability	×	×	—	—	—
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat	V	III	—	V	V
conditions	—	—	—	—	—
change	4-5	4-5	—	4-5	4-5
staining					
Light					
source	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
pale	6-7	5	5-6	5	5
medium	6-7	5	6	6	5
heavy	—	—	—	—	—
Nitrogen Oxides	—	—	2	2	—
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	5
staining	5	5	5	5	5
Pleating					
(steam)	conditions	conditions	conditions	conditions	conditions
change	—	—	—	—	—
staining	—	—	—	—	—
Washing					
conditions	III	III	II	II	III
change	5	5	5	5	5
staining	5	5	4-5	5	5
OTHER USES					
Textile		Acetate Triacetate	Nylon: suitable		
Non-Textile					
NOTES	Suitable for durable press finishing				

120	121	122	123	C.I. Disperse Blue
	Azo — ACETATE Greenish Blue greener	Monoazo — POLYESTER Navy redder	Anthraquinone — POLYESTER Reddish Blue little redder	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 77	N — moderate — good 5 5 1-2 AS ✓	HT HT method — — poor good 2-3 3 1 PS ✓	Nc, HT, T — — — — 4 4 4 PS ×	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	AATCC — — — Carbon arc 2 2 — 5 alkaline 5 4-5 — — — II 4-5 4-5	ISO intermediate 5 4-5 daylight — 6 6 — alkaline 5 5 intermediate 5 5 ISO 4 5 5	AATCC V — 5 Carbon arc 4 5 — — alkaline 5 5 — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
				OTHER USES Textile Non-Textile
	Apply from slightly acid bath Suitable for dischargeable grounds	Build up by carrier method at boil—poor	Suitable for durable press finishing	NOTES

C.I. Disperse Blue 124—130

C.I. Disperse Blue	124				125	
CHEMICAL CLASS	Monoazo				Monoazo	
C.I. CONSTITUTION NO.	—				—	
SUBSTRATE	ACETATE	TRIACETATE	POLYESTER	ACRYLIC	TRIACETATE	POLYESTER
HUE	Reddish Blue	Reddish Blue	Reddish Blue	Blue	Reddish Navy	Navy
Artificial Light (tungsten)	little redder	redder	much redder	little change	much redder	redder
DYEING						
Methods	N	N, Nc	Nc, (HT*)	N	Nc, HT	(Nc), HT, T
Dyeing Properties						
Rate	—	—	—	—	—	—
Temp. range	—	—	—	—	—	—
Levelling	—	—	—	—	—	—
Build-up	excellent	excellent	excellent	moderate	—	—
Reservation						
cotton	—	—	—	—	—	4-5
viscose	—	—	—	—	—	—
wool	—	—	—	—	—	3
PRINTING						
Fixation	—	—	—	—	—	—
Dischargeability	✓	✓	—	—	—	—
FASTNESS						
Test Methods			Nc method†			
Dry Heat	ISO mild	ISO severe	ISO severe	ISO mild	ISO intermediate	ISO intermediate
conditions	5	4	3-4	5	4-5	4-5
change	5	3-4	3	5	5	4-5
staining						
Light	Xenon arc	Xenon arc	Xenon arc	Xenon arc	daylight	daylight
source	5	4-5	4	4-5	—	—
pale	5	4-5	4-5	5	4	—
medium	5	4-5	4-5	5-6	5-6	6
heavy						
Nitrogen Oxides	5	5	—	—	5	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	5	5	4-5	5
change	4	5	5	5	5	5
staining						
Pleating	mild	intermediate	severe	intermediate	—	—
(steam)	5	5	4-5	5	—	—
change	5	5	4	4-5	—	—
staining						
Washing	ISO 2	ISO 3	ISO 3	ISO 3	ISO 3	ISO 3
conditions	4	5	5	5	4-5	5
change	3-4	4-5	5	5	5	5
staining						
OTHER USES						
Textile	Nylon: Light fastness poor, 2, 2, 2					
Non-Textile						
NOTES	*Care must be taken at temperatures above the boil as reduction of the dye can occur under these conditions Light fastness when HT dyed on polyester is excellent, 6-7, 7, 7 †Using o-phenylphenol carrier; dyeings heat aftertreated				Suitable for durable press finishing	

126		127	128	129	130	C.I. Disperse Blue
Anthraquinone		Anthraquinone	Azo	This C.I. Generic Name is discontinued	Monoazo	CHEMICAL CLASS
—		—	—		—	C.I. CONSTITUTION NO.
TRIACETATE	POLYESTER	POLYESTER	POLYESTER		POLYESTER	SUBSTRATE
Reddish Blue	Reddish Blue	Blue	Reddish Blue		Navy	HUE
redder	redder	little greener	redder		redder	Artificial Light (tungsten)
T(190–220°C)	T(190–220°C)	Nc, HT, T	HT, T		HT, (Nc) T(210–220°C)	DYEING Methods
—	—	—	—		—	Dyeing Properties
—	—	good	—		—	Rate
—	—	—	—		—	Temp. range
—	—	good	—		—	Levelling
—	—	4	—		2	Build-up
—	—	—	—		—	Reservation
—	—	1–2	—		1	cotton viscose wool
—	—	PS	PS, T		PS, T	PRINTING
×	×	×	✓		×	Fixation Dischargeability
ISO severe 4–5 3	ISO severe 3–4 2	ISO intermediate — 5	ISO — — —	This C.I. Generic Name is discontinued	ISO intermediate 4 3–4	FASTNESS Test Methods
daylight	daylight	daylight	daylight		daylight	Dry Heat
—	6	5–6	5–6		6	conditions
6–7	6–7	5–6	5–6		6	change
—	—	6	6		6	staining
1	—	5	—		—	Light
alkaline	alkaline	—	alkaline		alkaline	source
4	4–5	—	5		5	pale
5	5	—	5		5	medium
—	—	intermediate	—		intermediate	heavy
—	—	4–5	—		5	Nitrogen Oxides
—	—	4–5	—		5	Perspiration
ISO 3	ISO 4	ISO 3	ISO 4		ISO 4	acid/alk.
4–5	4	5	4		4–5	change
5	3–4	5	5		5	staining
		Acetate	Acetate and Triacetate: by printing		Unsuitable for triacetate, acetate, etc.	OTHER USES Textile
						Non-Textile
Recommended for application by thermofixation			Suitable for durable press finishing		Suitable for durable press finishing Shade slightly duller on thermofixation	NOTES

C.I. Disperse Blue 131—141

C.I. Disperse Blue	131	132	133	134	135	136
CHEMICAL CLASS	Anthraquinone	Anthraquinone	Disazo	Anthraquinone		Anthraquinone
C.I. CONSTITUTION NO.	—	—	—	61551		—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	POLYPROPYLENE*		POLYPROPYLENE*
HUE	Dull Blue→ Reddish Navy redder, duller	Blue	Reddish Navy redder	Blue		Dull Blue
Artificial Light (tungsten)		—		—		little change
DYEING					This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 72	
Methods	Nc, HT, T	T	T	1-1½ hrs at 95-100°C		1 hr at pH 5-6 and temps. 60-100°C
Dyeing Properties						
Rate	—	—	—	—		—
Temp. range	—	—	—	—		—
Levelling	—	—	—	—		—
Build-up	—	—	—	—		—
Reservation cotton	—	—	—	—		4-5
viscose	—	—	—	—		—
wool	3-4	—	—	—		2
PRINTING						
Fixation	—	PS, T	—	—		—
Dischargeability	x	x	x	—		—
FASTNESS						
Test Methods	ISO	AATCC	AATCC	ISO		ISO
Dry Heat conditions	intermediate	—	—	—		30sec/130°C
change	4	—	—	—		5
staining	3-4	—	—	—		5
Light source	daylight	Carbon arc	Carbon arc	daylight		daylight
pale	5	4-5	—	—		5-6
medium	6	4-5	—	4		6
heavy	6-7	5-6	6	—		—
Nitrogen Oxides	—	5	5	—		3
Perspiration acid/alk.	alkaline	alkaline	alkaline	—		alkaline
change	5	5	5	—		4-5
staining	5	5	5	—		4-5
Pleating conditions	severe	—	—	—		—
(steam) change	5	—	—	—		—
staining	4-5	—	—	—		—
Washing conditions	ISO 4	IIIA	IIIA	ISO 3		ISO 3
change	4-5	4-5	5	4		4-5
staining	4-5	5	5	5		4-5
OTHER USES						
Textile						
Non-Textile				C.I. Solvent Blue 36		
NOTES		Good fast- ness to sub- limation	Excellent fastness to sublimation	*Unmodified fibre		*Nickel-modified fibre

C.I. Disperse Blue 142—150

C.I. Disperse Blue	142	143	144	145	146
CHEMICAL CLASS	Azo	Anthraquinone	Anthraquinone	Anthraquinone	Azo
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	POLYESTER	POLYESTER
HUE	Navy	Bright Greenish Blue	Blue	Bright Blue	Reddish Navy
Artificial Light (tungsten)	little change	greener	greener, duller	—	redder
DYEING					
Methods	Nc, HT	Nc, HT	Nc, HT	Nc, HT	HT
Dyeing Properties					
Rate			—	moderate	moderate
Temp. range			—	—	—
Levelling			—	good	good
Build-up			—		
Reservation	cotton		—	4-5	4-5
	viscose		4	4-5	4-5
	wool		—	2	2
PRINTING					
Fixation			—	PS	PS
Dischargeability			—	x	x
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat	III	III	III	—	—
conditions	—	4-5	5	—	—
change	4-5	4	4-5	—	—
staining					
Light	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
source	—	6	4-5	6	5
pale	5	6	5-6	6	5-6
medium	—	—	5-6	6	6
heavy					
Nitrogen Oxides	—	—	—	—	—
Perspiration	acid/alk.	alkaline	alkaline	—	—
change	—	5	5	—	—
staining	—	5	5	—	—
Pleating	conditions	—	—	—	—
(steam)	change	—	—	—	—
	staining	—	—	—	—
Washing	conditions	III	II	III	III
change	5	5	5	5	5
staining	5	5	5	5	5
OTHER USES					
Textile				Acetate	
				Triacetate	
Non-Textile				Nylon	
NOTES					Excellent fastness to sublimation

147		148		149	150	C.I. Disperse Blue
Anthraquinone		Monoazo		Monoazo	Anthraquinone	CHEMICAL CLASS
ACETATE	TRIACETATE	ACETATE	TRIACETATE	POLYESTER	POLYPROPYLENE*	C.I. CONSTITUTION NO.
Bright Blue duller	Blue duller	Blue redder	Reddish Blue much redder	Greenish Blue greener	Blue	SUBSTRATE
						HUE
						Artificial Light (tungsten)
N	N, Nc, HT	N	Nc, HT	HT, T	60 min at 95-98°C	DYEING
						Methods
						Dyeing Properties
						Rate
						Temp. range
						Levelling
						Build-up
4	4	4	4			Reservation
1-2	1-2	1-2	1-2			cotton
						viscose
						wool
AS	PS	AS	PS	T		PRINTING
×	×			✓	×	Fixation
						Dischargeability
ISO	ISO	ISO	ISO	ISO	AATCC	FASTNESS
						Test Methods
						Dry Heat
						conditions
						change
						staining
daylight	daylight	daylight	daylight	daylight	Carbon arc	Light
5-6	5-6	5-6	5-6	5-6	6	source
6	6	5-6	5-6	5-6		pale
						medium
						heavy
2-3	2-3	5	5			Nitrogen Oxides
alkaline	alkaline	alkaline	alkaline	alkaline		Perspiration
4-5	4-5	4-5	4-5	5		acid/alk.
4	4	4	4	5		change
						staining
	intermediate		intermediate			Pleating
	4		4			(steam)
	3-4		3-4			conditions
						change
						staining
ISO 2	ISO 3	ISO 2	ISO 3	ISO 4	III	Washing
4	4-5	4	4	4-5	4-5	conditions
3	4-5	3-4	4-5	4-5	5	change
						staining
		Polyester: suitable				OTHER USES
						Textile
						Non-Textile
					*Unmodified fibre Recommended for carpet backings with minimum staining of pile	NOTES

C.I. Disperse Blue 151—153

C.I. Disperse Blue	151	152			
CHEMICAL CLASS	Anthraquinone	Anthraquinone			
C.I. CONSTITUTION NO.	—	—			
SUBSTRATE	POLYESTER	ACETATE	NYLON	TRIACETATE	POLYESTER
HUE	Reddish Blue	Reddish Blue	Reddish Blue	Reddish Blue	Reddish Blue
Artificial Light (tungsten)	redder	redder	redder	redder	redder
DYEING					
Methods	T (200–210°C), Pad–Steam	N	N	(Nc), HT, T	Nc, HT, T
Dyeing Properties				HT method	HT method
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	moderate	good	good	very good
Reservation	3	4	4	4	4
cotton	3	4	4	4	4
viscose	—	2	2	2	2
wool					
PRINTING					
Fixation	PS, T	—	—	—	—
Dischargeability	x	x	x	x	x
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	ISO
Dry Heat	intermediate	—	—	—	—
conditions	5	—	—	—	—
change	4–5	—	—	—	—
staining					
Light	daylight	daylight	daylight	daylight	daylight
source	7	4–5	5	5	6–7
pale	7	5–6	5	5	6–7
medium	—	—	—	5	—
heavy					
Nitrogen Oxides	—	2	5	3–4	5
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	5	5	5	5
change	5	3–4	4	5	5
staining					
Pleating	severe	—	—	—	—
(steam)	5	—	—	—	—
change	5	—	—	—	—
staining					
Washing	ISO 4	—	—	—	ISO 4
conditions	5	—	—	—	5
change	5	—	—	—	5
staining					
OTHER USES					
Textile	Triacetate: by printing, steam fixation at 130°C				
Non-Textile					
NOTES	Not suitable for appli- cation by exhaust dyeing methods				

153					C.I. Disperse Blue
Anthraquinone					CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	C.I. CONSTITUTION NO.
Bright Blue greener, duller	Bright Greenish Blue greener	Bright Blue greener, duller	Blue duller	Blue duller	SUBSTRATE
					HUE
					Artificial Light (tungsten)
N	N	N, Nc, HT	Nc, HT, T	N	DYEING Methods
D—slow E—poor D—moderate B—very good	slow poor moderate moderate	— — — —	— — — —	— — — —	Dyeing Properties Rate Temp. range Levelling Build-up
— — —	— — —	— — —	— — —	— — —	Reservation cotton viscose wool
AS x	AS x	PS x	PS x	PS x	PRINTING
					Fixation Dischargeability
ISO mild 5 5	ISO intermediate 5 5	ISO intermediate 4-5 4	ISO intermediate 5 4	ISO mild 5 5	FASTNESS Test Methods
daylight 5 6 6-7	daylight 4 4 5	daylight 5 5-6 6	daylight 6 6-7 6-7	daylight 6 6-7 7	Dry Heat conditions change staining
1-2	—	2	—	—	Light source pale medium heavy
alkaline 5 4-5	alkaline 5 5	alkaline 5 5	alkaline 5 5	alkaline 5 5	Nitrogen Oxides
mild 5 5	intermediate 5 5	intermediate 5 5	severe 5 5	intermediate 5 5	Perspiration acid/alk. change staining
ISO 2 4 3-4	ISO 2 5 5	ISO 3 4-5 5	ISO 4 5 4-5	ISO 2 5 5	Pleating conditions (steam) change staining
					Washing conditions change staining
					OTHER USES
					Textile
					Non-Textile
					NOTES

C.I. Disperse Blue 154—160

C.I. Disperse Blue		154				
CHEMICAL CLASS		Anthraquinone				
C.I. CONSTITUTION NO.		—				
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC
HUE		Reddish Blue	Blue	Reddish Blue	Reddish Blue	Dull Reddish Blue
Artificial Light (tungsten)		much redder	redder	much redder	much redder	redder
DYEING						
Methods		by printing	by printing	Nc, HT	Nc, HT	by printing
Dyeing Properties						
Rate		—	—	—	—	—
Temp. range		—	—	—	—	—
Levelling		—	—	—	—	—
Build-up		—	—	—	—	—
Reservation	cotton	—	—	5	5	—
	viscose	—	—	5	5	—
	wool	—	—	3	3	—
PRINTING						
Fixation		AS	AS	PS	PS, T	PS
Dischargeability		×	×	×	×	×
FASTNESS						
Test Methods		ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	mild	intermediate	severe	severe	mild
	change	5	4-5	4	4	5
	staining	5	3-4	3	2	4-5
Light	source	daylight	daylight	daylight	daylight	daylight
	pale	—	—	5	5-6	—
	medium	6	4	5-6	5-6	6
	heavy	—	—	6	5-6	—
Nitrogen Oxides		2	—	2	—	—
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
	change	5	4-5	5	4-5	5
	staining	5	4-5	5	5	5
Pleating (steam)	conditions	—	—	severe	severe	—
	change	—	—	4-5	4-5	—
	staining	—	—	4	4	—
Washing	conditions	ISO 1	ISO 3	ISO 4	ISO 4	ISO 3
	change	5	3-4	4-5	4-5	4-5
	staining	5	3	3-4	3-4	4
OTHER USES						
Textile						
Non-Textile						
NOTES						

155	156	157	158	159	160	C.I. Disperse Blue
Anthraquinone — POLYESTER Greenish Blue greener	Anthraquinone — POLYESTER Blue —	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Blue 132	Anthraquinone — POLYESTER Blue greener, duller	Anthraquinone — POLYPROPLENE* Dull Greenish Blue greener	Anthraquinone — POLYPROPYLENE* Bright Blue much greener	CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
HT, T — — — — — — PS, T x	HT — — — — — — — — PS, T x		Nc, HT, T — — — — 4-5 4-5 2 PS x	1 hr at 97- 100°C — — — poor — — — — —	1 hr at pH 5-6 and 97-100°C — — — good — — — — —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
AATCC IV 5 5 C. arc 6-7 6-7 — 5 alkaline 4 5 — — — III 4 5			AATCC — — — Carbon arc 6 6 6 — — — — — III 5 5	AATCC 30min/120°C 4 5 Carbon arc — 3-4 — — alkaline 4 4-5 — — — II 4 5	AATCC 30min/120°C 5 5 Carbon arc 4 6 — — alkaline 5 5 — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
			Acetate, Nylon and Triacetate: suitable			OTHER USES Textile Non-Textile
				*Unmodified fibre	*Nickel-modified fibre Good fastness to dry cleaning	NOTES

C.I. Disperse Blue 161—165

C.I. Disperse Blue	161	162	163	164
CHEMICAL CLASS	Anthraquinone	Anthraquinone	Anthraquinone	Anthraquinone
C.I. CONSTITUTION NO.	—	—	—	—
SUBSTRATE	POLYPROPYLENE*	POLYPROPYLENE*	POLYPROPYLENE*	POLYPROPYLENE*
HUE	Dull Blue	Greenish Blue	Reddish Navy	Navy
Artificial Light (tungsten)	redder, duller	greener, brighter	greener, duller	little change
DYEING				
Methods	1 hr at pH 5-6 and 97-100°C	1 hr at pH 5-6 and 97-100°C	1 hr at pH 5-6 and 97-100°C	1 hr at pH 5-6 and 97-100°C
Dyeing Properties				
Rate	—	—	—	—
Temp. range	—	—	—	—
Levelling	—	—	—	—
Build-up	very good	good	excellent	very good
Reservation				
cotton	—	—	—	—
viscose	—	—	—	—
wool	—	—	—	—
PRINTING				
Fixation	—	—	—	—
Dischargeability	—	—	—	—
FASTNESS				
Test Methods	AATCC	AATCC	AATCC	AATCC
Dry Heat	30min/120°C	30min/120°C	30min/120°C	30min/120°C
conditions	5	5	5	5
change	5	5	5	5
staining				
Light				
source	Carbon arc	Carbon arc	Carbon arc	Carbon arc
pale	5	4-5	—	—
medium	7	7	5-6	5-6
heavy	—	—	7	7
Nitrogen Oxides	—	—	—	—
Perspiration				
acid/alk.	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5
staining	5	5	5	5
Pleating				
(steam)	conditions	conditions	conditions	conditions
change	—	—	—	—
staining	—	—	—	—
Washing				
conditions	III	III	III	III
change	5	5	5	5
staining	5	5	4	4-5
OTHER USES				
Textile				
Non-Textile				
NOTES	*Nickel-modified fibre Good fastness to dry cleaning	*Nickel-modified fibre Good fastness to dry cleaning	*Nickel-modified fibre Good fastness to dry cleaning	*Nickel-modified fibre Good fastness to dry cleaning

165					C.I. Disperse Blue
Monoazo					CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACRYLIC	C.I. CONSTITUTION NO.
Blue	Blue	Reddish Blue	Blue	Bluish Grey	SUBSTRATE
redder	redder	redder	little redder	no change	HUE
					Artificial Light (tungsten)
by printing	by printing	Nc, HT, T	Nc, HT, T	by printing	DYEING
—	—	rapid	moderate	—	Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	good	good	—	Temp. range
—	—	—	4	—	Levelling
—	—	—	4	—	Build-up
—	—	—	3	—	Reservation
AS	AS	PS	PS, T	PS	cotton
✓	✓	✓	—	—	viscose
					wool
					PRINTING
					Fixation
					Dischargeability
ISO	ISO	ISO	ISO	ISO	FASTNESS
mild	—	intermediate	intermediate	mild	Test Methods
5	—	4-5	4-5	4	Dry Heat
5	—	4-5	4	5	conditions
daylight	daylight	daylight	daylight	daylight	change
—	—	5	5-6	—	staining
5	2	5	6	6	Light
—	—	5	6	—	source
5	—	4-5	—	—	pale
alkaline	alkaline	alkaline	alkaline	alkaline	medium
5	4	4-5	5	4-5	heavy
5	5	5	5	5	Nitrogen Oxides
—	—	severe	severe	—	Perspiration
—	—	3-4	4-5	—	acid/alk.
—	—	4-5	4-5	—	change
ISO1	ISO 3	ISO 3	ISO 4	ISO 3	staining
4-5	4	4-5	4-5	3	Pleating
4-5	4	5	4	5	(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
					Textile
					Non-Textile
May be subject to catalytic fading in admixture with some yellows and oranges Stable below pH 8.0					NOTES

C.I. Disperse Blue 166—174

C.I. Disperse Blue	166	167	168	169	170
CHEMICAL CLASS	Anthraquinone	Anthraquinone	Anthraquinone	Anthraquinone	Anthraquinone
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	POLYESTER	POLYESTER	POLYESTER	POLYESTER	POLYESTER
HUE	Blue	Reddish Navy	Blue	Blue	Reddish Blue
Artificial Light (tungsten)	little greener	redder	little redder	redder	redder
DYEING					
Methods	Nc, HT	(Nc), HT	Nc, HT	Nc, HT	Nc, HT
Dyeing Properties		Nc HT			
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	good excellent	—	—	—
Reservation cotton	—	—	—	—	—
viscose	—	—	—	—	—
wool	—	—	—	—	—
PRINTING					
Fixation	PS	—	—	—	—
Dischargeability	×	×	—	—	—
FASTNESS					
Test Methods	AATCC	AATCC	AATCC	AATCC	AATCC
Dry Heat	IV	III	III	III	III
conditions	—	5	5	5	5
change	4	4-5	3-4	3-4	4
staining					
Light	Carbon arc	Carbon arc	Carbon arc	Carbon arc	Carbon arc
source	5	5-6	5-6	5-6	3-4
pale	—	5-6	6	6	3-4
medium	—	6	6	6	4
heavy					
Nitrogen Oxides	—	—	—	—	—
Perspiration	alkaline	alkaline	—	—	—
acid/alk.	4-5	5	—	—	—
change	4-5	5	—	—	—
staining					
Pleating	—	—	—	—	—
(steam)	—	—	—	—	—
conditions	—	—	—	—	—
change					
staining					
Washing	III	III	III	III	III
conditions	5	5	5	5	5
change	5	5	5	5	5
staining					
OTHER USES					
Textile	Acetate and tri-acetate: by printing				
Non-Textile					
NOTES					

171		172	173	174	C.I. Disperse Blue
Monoazo		Anthraquinone	Monoazo	Monoazo	CHEMICAL CLASS
—		—	—	—	C.I. CONSTITUTION NO.
TRIACETATE	POLYESTER	POLYESTER	POLYESTER	POLYESTER	SUBSTRATE
Reddish Navy	Reddish Navy	Blue	Reddish Navy	Reddish Navy	HUE
duller	duller	little redder	—	—	Artificial Light (tungsten)
Nc, HT	HT, T	Nc, HT, T	Nc, HT, T	Nc, HT, T	DYEING Methods
—	—	—	—	—	Dyeing Properties
—	—	—	—	—	Rate
—	—	—	—	—	Temp. range
excellent	excellent	—	—	—	Levelling
—	—	—	4	—	Build-up
—	—	—	4	—	Reservation
—	—	—	1-2	—	cotton
—	—	—	—	—	viscose
—	—	PS	—	—	wool
—	—	X	—	—	PRINTING
—	—	—	—	—	Fixation
—	—	—	—	—	Dischargeability
ISO	ISO	AATCC	AATCC	AATCC	FASTNESS
severe	severe	III	III	III	Test Methods
5	5	—	5	5	Dry Heat
4	4	3-4	5	5	conditions
daylight	daylight	Carbon arc	Carbon arc	Carbon arc	change
—	—	—	—	—	staining
5	6	3	5	6-7	Light
5-6	6-7	—	—	—	source
4-5	—	—	—	—	pale
alkaline	alkaline	alkaline	alkaline	alkaline	medium
5	5	5	5	5	heavy
5	5	5	5	5	Nitrogen Oxides
severe	severe	—	—	—	Perspiration
5	5	—	—	—	acid/alk.
5	5	—	—	—	change
ISO 3	ISO 4	II	III	III	staining
5	5	5	5	5	Pleating
5	4-5	5	5	5	(steam)
—	—	—	—	—	conditions
—	—	—	—	—	change
—	—	—	—	—	staining
—	—	—	—	—	Washing
—	—	—	—	—	conditions
—	—	—	—	—	change
—	—	—	—	—	staining
		Acetate and tri- acetate: by print- ing			OTHER USES
					Textile
					Non-Textile
Sensitive to alkali; dye at pH 4-5			Particularly suit- able for thermo- fixation	Particularly suit- able for thermo- fixation	NOTES

C.I. Disperse Blue 175

C.I. Disperse Blue	175	
CHEMICAL CLASS	Azo	
C.I. CONSTITUTION NO.	—	
SUBSTRATE	POLYESTER	
HUE	Reddish Navy	
Artificial Light (tungsten)	—	
DYEING		
Methods	HT, T	
Dyeing Properties		
Rate	—	
Temp. range	—	
Levelling	—	
Build-up	—	
Reservation		
cotton	—	
viscose	—	
wool	—	
PRINTING		
Fixation	—	
Dischargeability	—	
FASTNESS		
Test Methods	AATCC	
Dry Heat		
conditions	V	
change	5	
staining	5	
Light		
source	Carbon arc	
pale	4-5	
medium	—	
heavy	—	
Nitrogen Oxides	5	
Perspiration		
acid/alk.	alkaline	
change	5	
staining	5	
Pleating		
(steam)		
conditions	—	
change	—	
staining	—	
Washing		
conditions	IVA	
change	4-5	
staining	4-5	
OTHER USES		
Textile		
Non-Textile		
NOTES		

C.I. Disperse Green 1—6

C.I. Disperse Green	1	2	3, 4	5	6
CHEMICAL CLASS	Aminoketone	Anthraquinone		Anthraquinone	Anthraquinone
C.I. CONSTITUTION NO.	56060	—		—	—
SUBSTRATE	ACETATE	ACETATE		POLYESTER	POLYESTER
HUE	Bluish Green	Dull Green*		Green	Bluish Green
Artificial Light (tungsten)	unchanged	little bluer		yellower	yellower
DYEING					
Methods	N	DD*		T	HT, T, (Nc)*
Dyeing Properties					
Rate	moderate	—		—	—
Temp. range	very good	poor		—	—
Levelling	good	—		—	—
Build-up	—	moderate		—	—
Reservation					
cotton	4	5		—	4
viscose	4	5		—	4
wool	1-2	4		—	1-2
PRINTING					
Fixation	not suitable	—		—	—
Dischargeability	—	—		—	—
			These C.I. Generic Names are discontinued		
FASTNESS					
Test Methods	ISO	ISO*		ISO	ISO
Dry Heat	conditions	—		severe	intermediate
change	—	—		4-5	4
staining	—	—		2-3	4-5
Light	source	daylight		daylight	daylight
pale	6	4		6	5
medium	6-7	5		6	5
heavy	7	5		—	5
Nitrogen Oxides	4	2		—	—
Perspiration	acid/alk.	alkaline		alkaline	alkaline
change	3-4	5		5	4-5
staining	3-4	5		4-5	4-5
Pleating (steam)	conditions	—		—	severe
change	—	—		—	4
staining	—	—		—	4
Washing	conditions	ISO1		ISO4	ISO3
change	3-4	4-5		4	5
staining	3-4	4-5		4	4-5
OTHER USES					
Textile	Nylon: hue— green	Nylon		Polyester blends with cotton and viscose	
Non-Textile	PVC fibres Woolskins and Furs Thermoplastics				
NOTES		*Developed with phenol (C.I. De- veloper 2) BP 396429 BP 396430 USP 2040927			*Build up limited with carrier

C.I. Disperse Brown 1—2

C.I. Disperse Brown		1				2
CHEMICAL CLASS		Monoazo				Monoazo
C.I. CONSTITUTION NO.		11152				—
SUBSTRATE		ACETATE	NYLON	TRIACETATE	POLYESTER	POLYESTER
HUE		Reddish Orange	Dull Reddish Brown	Reddish Orange	Reddish Brown	Reddish Brown
Artificial Light (tungsten)		much redder	little brighter	much redder	redder	redder
DYEING						
Methods		N	N (95°C)	N, HT, T	HT, T, (Nc)	Nc, HT, T
Dyeing Properties					HT method	
Rate		D—slow	moderate	D—slow	—	—
Temp. range		D—moderate	moderate	D—moderate	—	—
Levelling		D—moderate	good	D—moderate	moderate	—
Build-up		B—very good	very good	A—excellent	good	—
Reservation	cotton	3	4	4	3	4
	viscose	4	4	4	3	4
	wool	2	1-2	1	1	4
PRINTING						
Fixation		AS	—	PS	PS, T	PS, T
Dischargeability		✓	—	✓	—	—
FASTNESS						
Test Methods		ISO AATCC	ISO AATCC	ISO	ISO AATCC	ISO AATCC
Dry Heat	conditions	mild	inter.	intermediate	severe	inter.
	change	5	4-5	4-5	4-5	5
	staining	5	4-5	5	4	3-4
Light	source	day.	day.	daylight	day.	day.
	pale	5	3	4-5	5	5
	medium	6	3-4	5-6	5-6	6
	heavy	6-7	4	6	5-6	6-7
Nitrogen Oxides		5	5	5	5	—
Perspiration	acid/alk.	alk.	alk.	alkaline	alk.	alk.
	change	5	4-5	4-5	5	5
	staining	4	3-4	4-5	4-5	5
Pleating	conditions	mild	severe	intermediate	severe	—
(steam)	change	5	4-5	5	5	—
	staining	5	4-5	5	4-5	—
Washing	conditions	ISO 2	ISO 2	ISO 3	ISO 4	ISO 3
	change	4-5	4-5	4-5	5	5
	staining	4-5	4	4-5	4-5	5
OTHER USES						
Textile						Acetate: for pale dyeings
Non-Textile		Wool Sheepskins and Furs: light fastness 4				Acrylics*
NOTES		Very similar to C.I. Disperse Browns 4 and 5				*Acrylic: (AATCC), Light (C. arc), 5-6 Washing IIA, 4-5

C.I. Disperse Brown 3—6

C.I. Disperse Brown		3		4			
CHEMICAL CLASS		—		Monoazo			
C.I. CONSTITUTION NO.		—		—			
SUBSTRATE		ACETATE	POLYESTER	ACETATE	NYLON	TRIACETATE	POLYESTER
HUE		Brown	Reddish Brown	Reddish Orange	Dull Reddish Brown	Reddish Orange	Reddish Brown
Artificial Light (tungsten)		—	little yellower	much redder	little brighter	much redder	redder
DYEING							
Methods		N	Nc, HT, T	N	N (95°C)	N, HT, T	HT, T, (Nc)
Dyeing Properties							HT method
Rate		moderate	—	D—slow	moderate	D—slow	—
Temp. range		good	—	D—mod.	moderate	D—moderate	—
Levelling		—	—	D—mod.	good	D—moderate	moderate
Build-up		very good	—	B—v. good	very good	A—excellent	good
Reservation	cotton	4	—	3	4	4	3
	viscose	4	—	4	4	4	3
	wool	1-2	—	2	1-2	1	1
PRINTING							
Fixation		AS	PS	AS	—	PS	PS, T
Dischargeability		—	—	✓	—	✓	—
FASTNESS							
Test Methods		ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	intermediate	mild	intermediate	intermediate	severe
	change	—	4-5	5	4-5	4-5	4-5
	staining	—	3-4	5	4-5	5	4
Light	source	daylight	daylight	daylight	daylight	daylight	daylight
	pale	5	6-7	5	3	4-5	5
	medium	6	5-6	6	3-4	5-6	5-6
	heavy	6	5	6-7	4	6	5-6
Nitrogen Oxides		5	—	5	5	5	5
Perspiration	acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline	alkaline
	change	3-4	5	5	4-5	4-5	5
	staining	3-4	5	4	3-4	4-5	4-5
Pleating (steam)	conditions	—	intermediate	mild	severe	intermediate	severe
	change	—	4-5	5	4-5	5	5
	staining	—	5	5	4-5	5	4-5
Washing	conditions	—	ISO 4	ISO 2	ISO 2	ISO 3	ISO 4
	change	—	4-5	4-5	4-5	4-5	5
	staining	—	4-5	4-5	4	4-5	4-5
OTHER USES							
Textile		Nylon: printing					
Non-Textile							
NOTES				Very similar to C.I. Disperse Browns 1 and 5			

5				6	C.I. Disperse Brown
Monoazo					CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
ACETATE Reddish Orange much redder	NYLON Dull Reddish Brown little brighter	TRIACETATE Reddish Orange much redder	POLYESTER Reddish Brown redder		DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
N	N	N, HT, T	HT, T, (Nc)	This C.I. Generic Name is discontinued. The dyes formerly listed under it now appear under C.I. Disperse Brown 1	
—	—	—	—		
—	—	—	—		
—	—	—	—		
—	—	—	—		
—	—	—	—		
AS ✓	— —	PS ✓	PS, T —		
ISO — — —	ISO intermediate 4-5 4-5	ISO intermediate 4-5 5	ISO severe 4-5 4		FASTNESS Test Methods Dry Heat conditions change staining
daylight 5 6 6	daylight 3 3 3-4	daylight 4 4-5 5-6	daylight 5-6 5-6 5		Light source pale medium heavy
5	5	5	5		Nitrogen Oxides
acid 5 4	alkaline 4-5 4	alkaline 4-5 4-5	alkaline 5 4-5	Perspiration acid/alk. change staining	
— — —	intermediate 5 5	intermediate 5 5	severe 5 4-5	Pleating (steam) conditions change staining	
ISO2 4-5 4-5	ISO2 4-5 4	ISO3 4-5 4-5	ISO4 5 4-5	Washing conditions change staining	
					OTHER USES Textile Non-Textile
Very similar to C.I. Disperse Browns 1 and 4					NOTES

C.I. Disperse Brown 7—11

C.I. Disperse Brown	7	8	9	10	11
CHEMICAL CLASS	Azo	Azo	Monoazo	Azo	Disazo
C.I. CONSTITUTION NO.	—	—	—	—	—
SUBSTRATE	POLYESTER	POLYPROPYLENE*	POLYESTER	POLYESTER	POLYESTER
HUE	Reddish Brown	Dull Reddish Brown	—	Dull Orange	Brown
Artificial Light (tungsten)	yellower	little yellower	—	redder	—
DYEING					
Methods	Nc, HT, T	1 hr at pH 5-6 and temp. 60-100°C	Nc, HT, T	Nc, HT, T	Nc, HT, T
Dyeing Properties					
Rate	—	—	—	—	—
Temp. range	—	—	—	—	—
Levelling	—	—	—	—	—
Build-up	—	—	—	—	—
Reservation	4	—	—	—	4
cotton	4	—	—	—	—
viscose	1-2	—	—	—	2
wool					
PRINTING					
Fixation	PS, T	—	PS, T	—	—
Dischargeability	—	—	—	—	—
FASTNESS					
Test Methods	AATCC	ISO	AATCC	AATCC	AATCC
Dry Heat	V	30 sec/130°C	—	V	—
conditions	—	4-5	—	—	—
change	4-5	5	—	4-5	—
staining					
Light	Carbon arc	daylight	Carbon arc	Carbon arc	Carbon arc
source	5	5	6-7	—	—
pale	5	5	6	5	6
medium	—	5-6	—	—	—
heavy					
Nitrogen Oxides	—	—	—	5	—
Perspiration	alkaline	alkaline	alkaline	alkaline	alkaline
acid/alk.	5	4-5	5	5	5
change	5	4-5	5	5	5
staining					
Pleating	—	—	—	—	—
(steam)	—	—	—	—	—
change	—	—	—	—	—
staining					
Washing	III	ISO 3	III	IVA	III
conditions	5	4-5	5	—	5
change	5	4-5	5	4	5
staining					
OTHER USES					
Textile			Acetate and triacetate: dyeing, printing		
Non-Textile					
NOTES		*Nickel modified fibre Fastness to perchloroethylene 4-5, 5			

C.I. Disperse Black 1

C.I. Disperse Black			1									
CHEMICAL CLASS			Azo									
C.I. CONSTITUTION NO.			11365									
SUBSTRATE			ACETATE		NYLON		TRIACETATE			POLYESTER		
HUE			Bluish Black		Bluish Black		Bluish Blacks			Bluish Blacks		
Artificial Light (tungsten)			little greener		little greener		duller			little change		
DYEING			DD (1*)		DD (1*)		3 Az (1*); 2 Az.c(2 & 3*) 2 Az.HT(2 & 3*)			3Az(1*); 2Az.HT (2 & 3*)		
Methods												
Dyeing Properties			base dyeing		base dyeing		base dyeing (3 Az)			—		
Rate			A—very rapid		A—very rapid		B—rapid			—		
Temp. range			B—very good		B—very good		D—moderate			—		
Levelling			C—good		C—good		D—moderate			—		
Build-up			B—very good		A—excellent		B—very good			—		
Reservation	cotton	4	4		3		3-4			—		
	viscose	4	4		4		4			—		
	wool	2	2		2		2			—		
PRINTING			not suitable		not suitable		not suitable			not suitable		
Fixation			x		x		x			x		
Dischargeability												
FASTNESS			1*		1*		1* 2* 3*			1* 2* 3*		
Test Methods			ISO	AATCC	ISO	intermediate	ISO	ISO	ISO	ISO	ISO	ISO
Dry Heat	conditions	—	—		4		inter. 4-5			inter. 4-5		
	change	—	—		4		5			4-5		
	staining	—	—		4		5			4		
Light	source	day.	C.arc		daylight		day. day. day.			day. day. day.		
	pale	—	—		—		—			—		
	medium	3-4	—		—		3-4			5		
	heavy	5	5		4		5-6 6 5			6 5-6 5-6		
Nitrogen Oxides			5	5	5	5	5	5	5	5	5	5
Perspiration	acid/alk.	alk.	alk.		alkaline		alk. alk. alk.			alk. alk. alk.		
	change	5	4-5		5		5 5 5			5 5 4-5		
	staining	5	4-5		4		5 5 5			5 5 4-5		
Pleating (steam)	conditions	—	—		intermediate		inter. severe severe			inter. inter. inter.		
	change	—	—		4-5		5 5 5			5 5 4-5		
	staining	—	—		3		5 4-5 4			4-5 4-5 4		
Washing	conditions	ISO 2	II		ISO 2		ISO 4 ISO 4 ISO 4			ISO 4 ISO 4 ISO 4		
	change	5	5		5		5 5 5			5 5 4-5		
	staining	5	5		5		5 5 4			5 5 4-5		
OTHER USES												
Textile			Acrylics: may be applied to selected acrylic fibres by 2 bath azoic method using C.I. Azoic Coupling Component 18									
Non-Textile			Wool Sheepskins: light (ISO), 3-4 (Developed with C.I. Developer 8)									
NOTES			*Developed with: 1—C.I. Developer 8 (B.O.N.A.) 2—C.I. Azoic Coupling Component 18 3—C.I. Azoic Coupling Component 20 C.I. Developer 8 should not be mixed with C.I. Disperse Black 1 as it may yield tars This dye is also used as a component in a number of azoic combinations: for example, C.I. Disperse Blacks 12, 24 and C.I. Azoic Black 8 Literature: <i>Vickerstaff</i> , 273									

C.I. Disperse Black 2—5

C.I. Disperse Black		2							
CHEMICAL CLASS		Azo							
C.I. CONSTITUTION NO.		11255 and 37185							
SUBSTRATE		ACETATE		NYLON		TRIACETATE		POLYESTER	
HUE		Bluish Black		Black		Blacks		Blacks	
Artificial Light (tungsten)		little duller		little redder		duller		1—redder; 4—unchanged	
DYEING		DD (1*)		DD (1*)		3 Az (1*); 2 Az.c (2 & 3*); 2 Az.HT (2 & 3*)		3 Az (1*); 2 Az.HT (4*)	
Methods									
Dyeing Properties		base dyeing		base dyeing		base dyeing (3 Az)		—	
Rate		A—very rapid		rapid		C—moderate		—	
Temp. range		B—very good		very good		C—good		—	
Levelling		C—good		very good		C—good		—	
Build-up		A—excellent		excellent		—		—	
Reservation		cotton		4		4		—	
		viscose		4		4		—	
		wool		3		—		—	
PRINTING		not suitable		not suitable		not suitable		not suitable	
Fixation		x		x		x		x	
Dischargeability									
FASTNESS		1*		1*		1* 2* 3*		1* 4*	
Test Methods		ISO	AATCC	ISO	AATCC	ISO	ISO	ISO	ISO
Dry Heat		—	—	inter.	—	inter.	inter.	inter.	inter.
conditions		—	—	4-5	—	5	4-5	5	5
change		—	—	3-4	—	4-5	5	4-5	3
staining		—	—	—	—	—	—	—	—
Light		day.	C. arc	day.	C. arc	day.	day.	day.	day.
source		—	—	—	—	—	—	—	—
pale		3	—	—	—	—	—	—	—
medium		5	5	4	4-5	3	3	3	5-6
heavy		—	—	—	—	—	—	—	—
Nitrogen Oxides		5	5	—	—	5	5	5	—
Perspiration		alk.	alk.	alk.	alk.	alk.	alk.	alk.	alk.
acid/alk.		5	4	5	5	5	5	5	5
change		5	4	4	—	5	5	5	5
staining		—	—	inter.	—	inter.	inter.	inter.	inter.
Pleating		—	—	4	—	5	5	5	5
(steam)		—	—	4	—	4-5	5	5	4-5
staining		—	—	—	—	—	—	—	—
Washing		ISO 2	II	ISO 2	II	ISO 3	ISO 3	ISO 3	ISO 4
conditions		5	5	4-5	5	5	5	5	5
change		5	5	4-5	5	5	5	4-5	4-5
staining		—	—	—	—	—	—	—	—
OTHER USES									
Textile									
Non-Textile		Wool Sheepskins: light (ISO), 3-4 (Developed with C.I. Developer 8)							
NOTES		*Developed with: 1—C.I. Developer 8 (B.O.N.A.) 2—C.I. Azoic Coupling Component 18 3—C.I. Azoic Coupling Component 20 4—C.I. Azoic Coupling Component 15 C.I. Developer 8 should not be mixed with C.I. Disperse Black 2 as it may yield tars Literature: <i>Vickerstaff</i> , 273							

3			4	5	C.I. Disperse Black
Azo 11025			Azo 11220	Azo —	CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	ACETATE	ACETATE	C.I. CONSTITUTION NO.
Black*	Reddish Black*	Black*	Greenish Black*	Bluish Black*	SUBSTRATE
little redder	little redder	little redder	little change	duller	HUE
					Artificial Light (tungsten)
DD	DD	3Az	DD	DD	DYEING Methods
base dyeing B—rapid D—moderate B—very good B—very good	base dyeing rapid moderate very good very good	base dyeing B—rapid D—moderate B—very good B—very good	— moderate good — very good	base dyeing — — good —	Dyeing Properties Rate Temp. range Levelling Build-up
— 4 2-3	— 4 2-3	— 4 2-3	4 4 1-2	3-4 3-4 3	Reservation cotton viscose wool
not suitable	not suitable	not suitable	suitable colour discharge only ✓	not suitable	PRINTING Fixation
×	×	×		—	Dischargeability
ISO AATCC	ISO	ISO	ISO	ISO	FASTNESS Test Methods
— —	intermediate	intermediate	—	—	Dry Heat conditions
— —	2	2	—	—	change
— —					staining
day. C.arc	daylight	daylight	daylight	daylight	Light source
3 —	3	3	—	—	pale
3-4 —	3	3-4	—	—	medium
4-5 4-5	3-4	4	5	4-5	heavy
4 4	4-5	4	5	5	Nitrogen Oxides
alk. alk.	alkaline	alkaline	alkaline	alkaline	Perspiration acid/alk.
5 5	4	5	4	4	change
3-4 —	3-4	4	4	4	staining
— —	intermediate	intermediate	—	—	Pleating conditions
— —	4-5	4-5	—	—	(steam) change
— —	3	3	—	—	staining
ISO 2 II.	ISO 2	ISO 3	ISO 2	ISO 1	Washing conditions
4-5 4-5	4	4-5	4-5	5	change
3-4 4-5	4	3-4	4-5	5	staining
			Nylon; thinner blacks of lower light fastness	Nylon	OTHER USES Textile
					Non-Textile
*Develop with C.I. Developer 8 (B.O.N.A.) This dye should not be mixed with C.I. Developer 8 as it may yield tars Literature: <i>Vickerstaff</i> , 273			*Develop with C.I. Developer 8 (B.O.N.A.)	*Developed with C.I. Developer 8 (B.O.N.A.)	NOTES

C.I. Disperse Black 6—11

C.I. Disperse Black	6		7	8
CHEMICAL CLASS	o-Dianisidine		Azo	Azo
C.I. CONSTITUTION NO.	37235		11035	—
SUBSTRATE	ACETATE	NYLON	ACETATE	ACETATE
HUE	Reddish Navy→ Bluish Black* duller	Reddish Navy→ Bluish Black* duller	Bluish Black* duller	Black* —
Artificial Light (tungsten)				
DYEING				
Methods	DD	DD	DD	DD
Dyeing Properties	base dyeing	—	base dyeing	—
Rate	rapid	—	moderate	moderate
Temp. range	excellent	—	good	moderate
Levelling	very good	—	good	good
Build-up	very good	—	good	good
Reservation	cotton	4	4	4
	viscose	4	4	4
	wool	2	1-2	1-2
PRINTING				
Fixation	suitable colour discharge only	suitable colour discharge only	suitable colour discharge only	suitable colour discharge only
Dischargeability	✓	✓	✓	✓
FASTNESS				
Test Methods	ISO	AATCC	AATCC	ISO
Dry Heat	conditions	—	—	—
	change	—	—	—
	staining	—	—	—
Light	source	day.	Carbon arc	daylight
	pale	—	—	—
	medium	2	2	—
	heavy	2-3	—	5
Nitrogen Oxides	5	5	—	4
Perspiration	acid/alk.	alk.	alkaline	alkaline
	change	4-5	5	4-5
	staining	4-5	5	4-5
Pleating	conditions	—	—	—
(steam)	change	—	—	—
	staining	—	—	—
Washing	conditions	ISO 2	II	ISO 2
	change	4	5	3
	staining	4	5	3
OTHER USES				
Textile	See C.I. Azoic Diazo Component 48		Nylon: fastness as on Acetate Polyester	
Non-Textile				
NOTES	*Develop with C.I. Developer 8 (B.O.N.A.)		*Develop with C.I. De- veloper 8 (B.O.N.A.)	*Develop with C.I. De- veloper 8 (B.O.N.A.)

9			10		11	C.I. Disperse Black
Azo			Azo		Azo	CHEMICAL CLASS
—			—		—	C.I. CONSTITUTION NO.
ACETATE	NYLON	TRIACETATE	ACETATE	NYLON	ACETATE	SUBSTRATE
Bluish Black* redder	Bluish Black* redder	Bluish Black* redder	Greenish Black* greener	Greenish Black* little greener	Greenish Black* little change	HUE
						Artificial Light (tungsten)
DD	DD	DD†	DD	DD	DD	DYEING Methods
base dyeing B—rapid B—very good B—very good A—excellent	base dyeing moderate good good very good	base dyeing moderate — — —	base dyeing rapid good good —	— — — — —	— — — good —	Dyeing Properties Rate Temp. range Levelling Build-up
— 3-4 2-3	— 4 2-3	— — —	— — —	— — —	3-4 3-4 2	Reservation cotton viscose wool
not suitable x	not suitable x	not suitable x	— x	— x	not suitable x	PRINTING Fixation Dischargeability
ISO AATCC	ISO AATCC	ISO intermediate	AATCC	AATCC	ISO	FASTNESS Test Methods
— — — — — —	inter. V 2-3 — 4 3-4	5 3-4	— — —	— — —	— — —	Dry Heat conditions change staining
day. C.arc	day. C.arc	daylight	Carbon arc	Carbon arc	daylight	Light source pale medium heavy
3 2 4 4	— — 4 4	— 3-4	— 6-7	— 5	— 5-6	
4-5 4	— 5	4-5	5	5	5	Nitrogen Oxides
alk. alk.	alk. alk.	alkaline	alkaline	alkaline	alkaline	Perspiration acid/alk. change staining
5 3 5 2	4-5 4-5 3-4 4	5 5	5 4-5	4-5 4	4-5 5	
— —	inter. —	intermediate	—	—	—	Pleating conditions (steam) change staining
— —	3-4 —	5	—	—	—	
— —	4 —	4	—	—	—	Washing conditions change staining
ISO 2 II	ISO 2 II	ISO 3	II	II	ISO 1	
5 4 5 3	5 4-5 5 4-5	5 5	5 5	5 5	4-5 5	
					Nylon	OTHER USES Textile
						Non-Textile
*Develop with C.I. Developer 8 (B.O.N.A.) †Applicable by DD process to triacetate; most other diazo blacks require the 3Az process			*Develop with C.I. Developer 8 (B.O.N.A.)		*Develop with C.I. Developer 8 (B.O.N.A.)	NOTES

C.I. Disperse Black 12—19

C.I. Disperse Black	12				13
CHEMICAL CLASS	Azoic				Mixture*
C.I. CONSTITUTION NO.	—				—
SUBSTRATE	ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE
HUE	Navy→Bluish Black little change	Bluish Black little change	Bluish Black little change	Bluish Black little change	Greenish Black little redder
Artificial Light (tungsten)					
DYEING					
Methods	2 Az	2 Az	2 Az	2 Az.HT	N
Dyeing Properties					
Rate	—	—	—	—	moderate
Temp. range	—	—	—	—	excellent
Levelling	—	—	—	—	good
Build-up	—	—	—	—	good
Reservation					
cotton	—	3	—	4	4
viscose	—	3	—	4	4
wool	—	—	—	—	1-2
PRINTING					
Fixation	not suitable	not suitable	not suitable	not suitable	not suitable
Dischargeability	x	x	x	x	—
FASTNESS					
Test Methods	ISO	ISO	ISO	ISO	ISO
Dry Heat	—	severe	intermediate	intermediate	—
conditions	—	—	—	—	—
change	—	4	4-5	4	—
staining	—	—	—	—	—
Light					
source	daylight	daylight	daylight	daylight	daylight
pale	—	—	—	—	4
medium	—	—	—	—	6
heavy	6-7	5	4-5	5-6	7
Nitrogen Oxides	5	—	5	5	5
Perspiration					
acid/alk.	alkaline	alkaline	alkaline	alkaline	alkaline
change	5	5	5	5	4
staining	5	5	5	5	2-3
Pleating					
(steam)	conditions	severe	intermediate	severe	—
change	—	4	5	2-3	—
staining	—	3	5	3-4	—
Washing					
conditions	ISO 3	ISO 3	ISO 4	ISO 4	ISO 2
change	5	5	5	4-5	2-3
staining	5	5	4-5	4-5	2
OTHER USES					
Textile					Nylon: light 5; persper- ation 4, 2
Non-Textile					Woolskins and Furs Thermoplastics
NOTES	Literature: BP 606896; FP 994785; Ital P 414632 An azoic dye—the developer is contained in the dye Similar to C.I. Disperse Black 24 and C.I. Azoic Black 8				*Main component not available separately

14				15	16—19	C.I. Disperse Black
Azo				Azoic		CHEMICAL CLASS
ACETATE	NYLON	TRIACETATE	POLYESTER	ACETATE		C.I. CONSTITUTION NO.
Black*	Black*	Black*	Black*	Black		SUBSTRATE
—	—	—	little change	little change		HUE
						Artificial Light (tungsten)
DD	DD	3 Az	3 Az.c 3 Az.HT	2 Az	These C.I. Generic Names are discontinued	DYEING
—	—	—	—	—		Methods
—	—	—	—	—		Dyeing Properties
—	—	—	—	—		Rate
—	—	—	—	—		Temp. range
—	—	—	—	—		Levelling
—	—	—	—	—		Build-up
—	—	—	3	4		Reservation
—	—	—	—	4		cotton
—	—	—	—	3		viscose wool
not suitable ×	not suitable ×	not suitable ×	not suitable ×	not suitable ×		PRINTING
						Fixation
						Dischargeability
ISO mild 4-5 4-5	ISO mild 4 3	ISO intermediate 4 3-4	ISO intermediate 3 2-3	ISO — — —	These C.I. Generic Names are discontinued	FASTNESS
daylight	daylight	daylight	daylight	daylight		Test Methods
—	—	—	—	—		Dry Heat
4	4	4	5-6	4-5		conditions change staining
5	4-5	4	5	5		Light
alkaline	alkaline	alkaline	alkaline	alkaline		source pale medium heavy
4-5	4-5	4-5	5	4		Nitrogen Oxides
3-4	3-4	4-5	4-5	4		Perspiration
—	—	—	intermediate	—		acid/alk. change staining
—	—	—	4-5	—		Pleating
—	—	—	4-5	—		(steam)
ISO1	ISO1	ISO3	ISO4	ISO1		conditions change staining
5	5	4-5	4-5	5		Washing
4	4-5	4-5	4-5	5		conditions change staining
Polyester: may be applied by method 2 Az.HT in combination with C.I. Azoic Coupling Component 18 Acrylics: not suitable				Nylon: suitable		OTHER USES
						Textile
						Non-Textile
*Develop with C.I. Developer 8 (B.O.N.A.) Light fastness on polyester is not lowered by residual phenolic carrier Not recommended for thermofixation				An azoic dye —developer is contained in the dye Literature: BP 606896		NOTES

C.I. Disperse Black 20—27

C.I. Disperse Black	20	21	22		23
CHEMICAL CLASS	—		Azo		
C.I. CONSTITUTION NO.	—		—		
SUBSTRATE	ACETATE*		ACETATE	TRIACETATE	
HUE	—		Bluish Black*	Bluish Black*	
Artificial Light (tungsten)	—		—	—	
DYEING					
Methods	DD		DD	3 Az	
Dyeing Properties			base dyeing		
Rate	—		moderate	—	
Temp. range	—		moderate	—	
Levelling	—		—	—	
Build-up	—		good	—	
Reservation cotton	—		4	4	
viscose	4		4	4	
wool	—		2	2	
PRINTING					
Fixation	—		—	—	
Dischargeability	—		—	—	
		This C.I. Generic Name is discontinued			This C.I. Generic Name is discontinued
FASTNESS					
Test Methods	AATCC		ISO	ISO	
Dry Heat	—		—	—	
conditions	—		—	—	
change	—		—	—	
staining	—		—	—	
Light	Carbon arc		daylight	daylight	
source	—		—	—	
pale	—		—	—	
medium	5		4-5	4	
heavy	—		—	—	
Nitrogen Oxides	—		5	5	
Perspiration	alkaline		alkaline	alkaline	
acid/alk.	5		5	4	
change	5		4-5	5	
staining	—		—	—	
Pleating	—		—	—	
(steam)	—		—	—	
change	—		—	—	
staining	—		—	—	
Washing	II		—	ISO 3	
conditions	5		—	4	
change	5		—	4-5	
staining	—		—	—	
OTHER USES					
Textile	Acetate; may also develop with C.I. Azoic Coupling Component 18				
Non-Textile					
NOTES	*Develop with C.I. De- veloper 8 (B.O.N.A.)		*Develop with C.I. Developer 8 (B.O.N.A.)		

24		25	26	27	C.I. Disperse Black
Azoic		Azo	Azo	Azo	CHEMICAL CLASS
—		—	—	—	C.I. CONSTITUTION NO.
ACETATE	NYLON	POLYESTER	POLYESTER	POLYESTER	SUBSTRATE
Bluish Black	Bluish Black	Greenish Black*	Bluish Black*	Black	HUE
little redder	little redder	—	—	—	Artificial Light (tungsten)
2 Az	2 Az	2 Az.c 2 Az.HT	2 Az.c 2 Az.HT	2 Az	DYEING
—	—	—	—	—	Methods
—	—	moderate	—	—	Dyeing Properties
—	—	moderate	—	—	Rate
—	—	good	—	—	Temp. range
—	—	—	—	—	Levelling
—	—	—	—	—	Build-up
—	—	—	3	—	Reservation
—	—	—	—	—	cotton
—	—	—	—	—	viscose
—	—	—	—	—	wool
—	—	—	—	—	PRINTING
—	—	—	—	—	Fixation
—	—	—	—	—	Dischargeability
ISO	ISO	AATCC	AATCC	—	FASTNESS
—	—	—	III	—	Test Methods
—	—	—	—	—	Dry Heat
—	—	—	4-5	—	conditions
daylight	daylight	Carbon arc	Carbon arc	—	change
—	—	—	—	—	staining
3-4	5-6	6	5	—	Light
—	—	—	—	—	source
alkaline	alkaline	—	—	—	pale
4-5	4-5	—	—	—	medium
4	4	—	—	—	heavy
—	—	—	—	—	Nitrogen Oxides
—	—	—	—	—	Perspiration
—	—	—	—	—	acid/alk.
ISO 2	ISO 2	III	II	—	change
4	4-5	4-5	5	—	staining
3	4	5	5	—	Pleating
					(steam)
					conditions
					change
					staining
					Washing
					conditions
					change
					staining
					OTHER USES
					Textile
					Non-Textile
An azoic dye—the developer is contained in the dye Similar to C.I. Disperse Black 12 and C.I. Azoic Black 8		*Develop with C.I. Azoic Coupling Component 18	*Develop with C.I. Azoic Coupling Component 18		NOTES

C.I. Disperse Black 28—34

C.I. Disperse Black	28		29		29:1	30
CHEMICAL CLASS	Azo		—		Similar in hue application and properties to C.I. Disperse Black 29 but slightly different chemically	Azo
C.I. CONSTITUTION NO.	—		—			—
SUBSTRATE	ACETATE	POLYESTER	ACETATE	POLYESTER		POLYESTER
HUE	Black*	Black†	Black*	Black†		Black*
Artificial Light (tungsten)	—	—	—	—		—
DYEING						
Methods	DD	2 Az.c 2 Az.HT	DD	2 Az.c 2 Az.HT		2 Az.c 2 Az.HT
Dyeing Properties						
Rate	—	—	—	—		—
Temp. range	—	—	—	—		—
Levelling	—	—	—	—		—
Build-up	—	—	—	—		—
Reservation	—	—	—	—		—
cotton	—	—	—	—		—
viscose	4	4	4	4		2
wool	—	—	—	—		4
PRINTING						
Fixation	—	—	not suitable	not suitable		—
Dischargeability	—	—	x	x		—
FASTNESS						
Test Methods	AATCC	AATCC	AATCC	AATCC		AATCC
Dry Heat	I	III	I	III		III
conditions	5	—	5	—		—
change	5	4-5	5	4-5		4-5
staining						
Light	Carbon arc	Carbon arc	Carbon arc	Carbon arc		Carbon arc
source	—	—	—	—		—
pale	—	—	—	—		—
medium	7-8	7	7-8	6-7		6
heavy						
Nitrogen Oxides	5	—	5	—		—
Perspiration	acid/alk.	—	alkaline	—		—
change	5	—	5	—		—
staining	5	—	5	—		—
Pleating	conditions	—	—	—		—
(steam)	change	—	—	—		—
staining	—	—	—	—		—
Washing	conditions	II	II	II		II
change	4-5	5	4-5	5		5
staining	5	5	5	5		5
OTHER USES						
Textile						
Non-Textile						
NOTES	*Develop with C.I. Developer 8 †Develop with C.I. Azoic Coupling Component 18		*Develop with C.I. Developer 8 †Develop with C.I. Azoic Coupling Component 18			*Develop with C.I. Azoic Coupling Component 18

31	32	33	34			C.I. Disperse Black
Azo — POLYESTER Black —	Azoic — ACETATE Black little change	Azo — POLYESTER Greenish Black* —	Azo — ACETATE Navy→ Bluish Black* redder			CHEMICAL CLASS C.I. CONSTITUTION NO. SUBSTRATE HUE Artificial Light (tungsten)
	2 Az — — good — 3-4 3-4 3 not suitable —	2 Az.c 2 Az.HT slow — — — — 4 4 1-2 not suitable x	DD — — — — 5 5 2 not suitable —	DD — — — — — — — not suitable —	2 Az.c 2 Az.HT — — — — — — — not suitable —	DYEING Methods Dyeing Properties Rate Temp. range Levelling Build-up Reservation cotton viscose wool PRINTING Fixation Dischargeability
	ISO — — — daylight — 5 5 alkaline 4 4 — — — ISO 1 5 5	AATCC — — — Carbon arc — 5 — — — — II 5 5	AATCC — — — Carbon arc — 4 5 5 alkaline 5 5 — — — II 4-5 4	AATCC — — — Carbon arc — 4-5 5 4-5 alkaline 5 5 — — — II 5 5	AATCC — — — Carbon arc — 5 5 — alkaline 5 5 — — — III 5 5	FASTNESS Test Methods Dry Heat conditions change staining Light source pale medium heavy Nitrogen Oxides Perspiration acid/alk. change staining Pleating conditions (steam) change staining Washing conditions change staining
			Acetate and triacetate: greenish blacks obtained with C.I. Developer 19; reds obtained with C.I. Developer 1			OTHER USES Textile Non-Textile
	An azoic dye —the devel- oper is con- tained in the dye	*Develop with C.I. Azoic Coupling Component 18	*Develop with C.I. Developer 8 (B.O.N.A.) †Develop with C.I. Azoic Coupling Component 18			NOTES

NOTES

FLUORESCENT BRIGHTENERS

Colourless compounds which fluoresce under ultraviolet radiation were first used by the British firm of security printers, Waterlow & Sons Ltd. (BP 292393, 417488) and later by Imperial Chemical Industries Ltd. (BP 442530, USP 2089413) primarily to prevent forging of banknotes or other securities. Their use for imparting a whitening effect to textiles seems to have been first recorded by P. Kraus (*Melliand*, **10** (1929) 468). Some years later Ultrazell GmbH (BP 472473) suggested their use in starch finishes and H. Meyer (BP 522678) and Lever Brothers (BP 566810) claimed the use of these products in soap or other detergents. They made their general appearance in the early part of the 1939–45 war and their use is now firmly established

particularly for paper and textiles, and large quantities are now incorporated into soap and proprietary household detergents. They are used not only to impart improved whiteness, for which purpose they have largely replaced Ultramarine, Methyl Violet and the other older blueing agents, but also to improve the colour of white discharges and to add brightness to delicately coloured dyeings and prints. Agents of this type, the Fluorols (IG) in the 1930's found a use in the imparting of fluorescence to oils, and oil- or solvent-soluble products still find a use in the oil, paint, varnish and wax trades. Attention is also drawn to the work done during 1939–45 by the IG on the Lumogen Fluorescent Dyes (FD 519/50).

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BIOS 259, 574, 987, 1088, 1154 and 1239
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FD 1644/48, 519/50 and 101/51
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Literature on Fluorols

- BIOS* 987
FD 287/51; 513/51
FDX 645; 850; 860; 885 (PB 74719); 987

Literature on Lumogens

- BIOS* 61; 987; Misc. 55
FIAT 577; 1302
FDX 363; 524; 578; 583; 700; 812; 854; 885 (PB 74692)

NOTES

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
1	40630 Stilbene Bright blue	CELLULOSE: From dyebath or or pad; exhausts well at low temp. without presence of salt	Good solubility in water. Stable to acids and reducing agents FASTNESS: Chlorine, moderate; Light, good; Wash- ing, very good LITERATURE Caspar, <i>Textil-Rundschau</i> , 2 (1947) 212 Landolt, <i>Ibid.</i> , 3 (1948) 379
1:1	Stilbene Slightly bluer than C.I. Fluorescent Brightener 1	CELLULOSE: Exhausts in 10–15 min at 30–35°C	FASTNESS: Acids, good; Chlorine, poor; Reducing agents, excellent
2	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 1:1		
3	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 28		
4	Naphthalimide Yellow PREPARATION: <i>USP</i> 2415373	Nylon and acetate from aq. dispersions. Lacquers	Insoluble in hydrocarbons and water, very soluble in formic acid, soluble in alcohol and esters
5	36900 Stilbene Reddish blue	PAPER CELLULOSE: From a neutral bath and in white discharges	Good substantivity for cellulose, poor fastness to chlorine—turns yellow, good fastness to peroxide and satisfactory fastness to light LITERATURE: <i>FD</i> 101/51
5:1	36900 (similar to) Trisazo Reddish blue	PAPER	Good substantivity for cellulose. Poor fastness to chlorine—turns yellow LITERATURE: <i>FD</i> 101/51
6	Aroylaminostilbene Blue PREPARATION: <i>USP</i> 2468431	CELLULOSE: From a neutral or soap bath	Good fastness to chlorine
7	Benzidine sulphone Greenish blue PREPARATION: <i>USP</i> 2563795	CELLULOSE	Outstanding fastness to chlorine
8	Benzidine sulphone Greenish blue PREPARATION: <i>USP</i> 2563493	CELLULOSE: From a neutral or soap bath	Excellent fastness to chlorine
9	40621 Bistriazinylaminostilbene	CELLULOSE: From a neutral or soap bath	Poor fastness to chlorine
9:1	Closely related to C.I. 40621 Bistriazinylaminostilbene	CELLULOSE: From a neutral or soap bath	Poor fastness to chlorine
10	Stilbene Blue	CELLULOSE	High substantivity, good solubility, good fastness to light but not fast to chlorine

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
11	Stilbene Reddish blue	CELLULOSE: From a neutral or soap bath	Excellent fastness to chlorine
12	Stilbene Bluish	CELLULOSE	Good substantivity and moderate fastness to chlorine
13	Stilbene Bluish	CELLULOSE: From a neutral, alkaline or soap bath	Moderate fastness to chlorine
14	Stilbene Bluish	CELLULOSE: From a neutral, alkaline or acid bath. Exhausts well from cold soln., rate of exhaustion decreasing above 60°C	Compatible with ionic and non-ionic softening agents
15	Stilbene Blue	CELLULOSE and PAPER: From moderately acid to alkaline media, cellulose from a hot or cold, soap or detergent soln. NYLON: From a boiling acidic bath	Soluble in aq. media to cloudy soln. Excellent substantivity FASTNESS: Acid, good; Alkali, very good; Chlorine, very good; Dithionite, very good; Peroxide, very good; Light, moderate
16	Stilbene Blue	CELLULOSE, WOOL and NYLON From a soap or synthetic detergent bath. Main use is in household washing compositions	Slightly soluble in aq. detergent soln. Excellent substantivity FASTNESS: Acid, poor; Alkali, very good; Chlorine, good; Dithionite, very good; Peroxide, very good; Light, moderate
17	Stilbene Blue	CELLULOSE and PAPER: From a neutral or weakly alkaline bath preferably in presence of salt	High solubility. Substantivity low and salt-sensitive. Good stability to dithionite and perborate but poor fastness to chlorine
17:1	Stilbene Blue	NYLON: From alkaline media, especially alkaline peroxide bleaching baths	High substantivity. Dispersible in water FASTNESS: Acid, poor; Alkali, very good; Chlorine, good; Dithionite, very good; Peroxide, very good; Light, moderate
18	Bright bluish	CELLULOSE: From dyebaths, detergent soln. or in finishes	Moderately soluble in water. Compatible with cationic softeners and stable to resin finishing. Very good fastness to chlorine, light and washing
19		CELLULOSE: From neutral soln	Stable to peroxide and dithionite. May be used in discharge pastes and in resin finishes
20	Stilbene	CELLULOSE: From a neutral bath and for brightening discharges	Good fastness to perborate and peroxide, moderate fastness to chlorine and chlorites
21	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 5		

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
22	Stilbene Clear bluish	CELLULOSE, SILK and in de- tergents	FASTNESS: Chlorine, good; Light, good; Washing, very good
23	Stilbene Bluish violet	PAPER: From neutral or slight- ly acid soln. added to the pulp or from slightly alkaline soln. applied to the web	Good fastness to chlorine
24	Bistriazinylaminostilbene Bluish violet	PAPER and CELLULOSE: From alkaline or neutral baths, in acidic finishes or peroxide bleaching baths	Very soluble in water FASTNESS: Chlorine, very good; Light, good; Wash- ing, very good LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 344
25	Stilbene Bluish violet	COTTON, using 5-20% salt to get exhaustion. WOOL and MOHAIR from an acid bath. In beater dyeing and surface colouring of paper. Mixed dry with sodium bifluoride or silico- fluoride in formulating laundry sours	Very soluble in cool or warm water
26	Thiazole Reddish blue	CELLULOSE and PAPER: From a neutral or weakly alkaline bath NYLON: From a weakly acid bath, especially with a sulph- oxylate	Excellect fastness to chlorine
27	This C.I. Generic Name is discontinued, brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 5:1		
28	40622 Stilbene Pale blue	CELLULOSE and PAPER: From neutral or weakly alkaline bath NYLON: From a weakly acid bath, especially with a sulph- oxylate. Used also in soaps and detergents	Very good substantivity; builds up well Moderately good fastness to chlorine
29	Pure blue	PAPER: From neutral bath	High substantivity for cellulose LITERATURE Siegrist, <i>Das Papier</i> , 8 (1954) 109
30	40600 Stilbene Reddish violet in daylight, bluish violet under u.v. radiation	CELLULOSE, PROTEIN FIBRES and NYLON from a neutral or weakly acid bath WOOL: From a peroxide bleach- ing bath PAPER in the stock or surface colouring	FASTNESS: Chlorine, poor; Stoving, very good. Stable to dithionite LITERATURE Diserens, <i>Neue Verfahren in der Technik der chemischen Veredlung der Textilfasern</i> , Vol.1 (1948) 507 Landolt, <i>Textil-Rundschau</i> , 3 (1948) 379 BIOS 259, 3; 574, 158; 1088; 1373 (Blancophor R) FIAT 644; 1302 (Blancophor R) FD 3412/46, 526/50, 513/51 (Blancophor) FDX 673 (Blancophor R)

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
31		Mixtures of cellulose, protein fibres and nylon from a neutral bath	Good fastness to chlorine LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340
32	40620 Bistriazinylaminostilbene Bluish	CELLULOSE, PROTEIN FIBRES and NYLON: From a neutral or weakly acid bath and in discharge pastes and dithionite bleaching baths PAPER either in the stock or by coating, spraying or dipping	Solutions are sensitive to light FASTNESS: Chlorine, poor; Washing, good LITERATURE Landolt, <i>Textil-Rundschau</i> , 3 (1948) 379; 8 (1953) 344 BIOS 1088; 1154; 1373 (Blancophor B) FIAT 644; 1302 (Blancophor B) FDX 673 (Blancophor B)
33	Stilbene Blue (peak at 437 nm)	CELLULOSE, PROTEIN FIBRES and NYLON: From a neutral or weakly alkaline bath	Fair fastness to chlorine
34	40605 Stilbene	CELLULOSE, PROTEIN FIBRES and NYLON: From a neutral or weakly acid bath	Moderate fastness to chlorine
35	Stilbene Blue	PAPER: From a neutral or acid bath	Solubility good, substantivity moderate, stable in presence of alum and size FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Peroxide, very good; Light, moderate
36	Balanced anionic-cationic complex Bluish violet	PROTEIN FIBRES, ACETATE and NYLON. From acid, neutral or alkaline baths	Stable to dithionite and peroxide
37		CELLULOSE, PROTEIN FIBRES and NYLON: From a neutral or weakly acid bath or in dithionite discharge pastes and resin finishes	Good fastness to light LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 339
38		Mixtures of CELLULOSE, PROTEIN FIBRES and NYLON: From neutral baths	May be used in wash liquors and oxidising and reducing discharge pastes LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340
39	Greenish blue	POLYESTER, ACRYLIC and PROTEIN FIBRES, NYLON, ACETATE and CELLULOSE from a neutral weakly acid or weakly alkaline bath. Polyesters and acrylics are treated at the boil	Stable to peroxide, chloride and peracetic acid Fastness to light on acetate is good and on polyesters and acrylics very good
40	40647 Stilbene Blue	CELLULOSE, PROTEIN FIBRES, NYLON and ACETATE: From a neutral or weakly acid bath and in discharge pastes	Stable to dithionite and peroxide. Good fastness to washing, poor fastness to chlorine

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
41	Thiazole Reddish blue	CELLULOSE and NYLON: From a neutral or weakly acid bath	Stable to hypochlorite, good fastness to chlorine LITERATURE Taylor, <i>JSDC</i> , 66 (1950) 185 Landolt, <i>Textil-Rundschau</i> , 3 (1948) 379; 8 (1953) 339 Diserens, <i>Chemical Technology of Dyeing and Printing</i> , Vol.2 (N.Y. 1951) 82
42	Green	CELLULOSE and NYLON: From neutral or weakly acid bath. Used for shading	Good fastness to chlorine LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 339
43	Application and properties very similar to those of C.I. Fluorescent Brightener 48		
44	Aminocoumarin Bluish violet PREPARATION: USP 2661305	PROTEIN FIBRES and ACETATE: From a weakly acid bath, es- pecially useful for furs	Fast to peroxide and reducing agents
45	Heterocyclic Blue	CELLULOSE, ACETATE and NY- LON: From a neutral or alkal- line bath. Used in soap and detergents	Very good fastness to chlorine and peroxide. Effect not cumulative on repeated laundering LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340
46	40625 Bistriazinylaminostilbene Slightly bluish	CELLULOSE and NYLON, also for soaps and detergents	Fastness properties on textiles are the same as those of C.I. Fluorescent Brightener 59
47	Stilbyl-naphthotriazole Greenish	CELLULOSE, PROTEIN FIBRES and NYLON: also for soaps and detergents	Fastness properties on textiles are the same as those of C.I. Fluorescent Brightener 59
48	40640 Diphenylgloxaline Blue	PROTEIN FIBRES from a weakly acid bath	Moderate fastness to chlorine, stable to peroxide and reducing agents LITERATURE Diserens, <i>Neue Verfahren in der Technik der chemischen Veredlung der Textilfasern</i> , Vol. 1 (1948) 507 Landolt, <i>Textil-Rundschau</i> , 3 (1948) 379 <i>BIOS</i> 259, 4; 1239, 7; 1373, 37 (Blancophor WT) <i>FIAT</i> 1302; 1373, 29 (Blancophor WT)
49	Bistriazinylaminostilbene Bluish	CELLULOSE and NYLON: May be used together with any anionic or non-ionic com- pound but presence of anionic surfactants reduces its sub- stantivity to nylon. May be used in dithionite or peroxide bleaching baths. Added to the furnish in the beater partic- ularly for bleached paper stock, also used in surface-colour- ing of paper	Anion-active, very stable to acids and alkalis. Solu- tions are light sensitive

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
50	A deriv. of 4,4'-diamino-1,1'-stilbene-2,2'-disulphonic acid Bluish	CELLULOSE: From an acid, neutral or alkaline bath, and NYLON from an acid or neutral bath. May be used in chlorite, peroxide or dithionite bleaches. Excellent exhaustion in the cold with addition of a little sodium sulphate, above 60°C rate of exhaustion diminishes. Low tendency to build up on repeated application	Readily soluble in hot water, if hard water is used the solution may be cloudy but this has no effect on the fluorescent properties FASTNESS: Acid, good; Chlorine, moderate; Light, good; Washing, moderate
51	Naphthalic acid deriv. Bright blue	ACETATE, NYLON, ACRYLIC and POLYESTER FIBRES from aq. dispersion, disperse dye-baths or bleaching liquors and for brightening white discharges on acetate and nylon	Not substantive to animal fibres and cellulose. Unaffected by hard water and by treatment with acid or neutral and, in most cases, cationic softeners FASTNESS: Alkali, both in substance and on the fibre, only moderate, liable to turn greenish; Chlorine, Light and Washing, very good
52	Coumarin Bluish violet	PROTEIN FIBRES, ACETATE and NYLON: From a neutral or weakly acid bath. Can be used with soap and detergents or in peroxide bleaching baths. Particularly suitable for fur pelts. Exhausts at 30-40°C. Also applicable to cellulose and paper	Readily soluble in cold water, soln. susceptible to prolonged exposure to light FASTNESS: Washing, moderate to good; Light, moderate
53	Aminocoumarin Reddish blue	Protein fibres, nylon, acetate and for soaps and detergents	Stable to acids, peroxide and dithionite
54	Greenish blue	PROTEIN FIBRES and NYLON: From neutral to slightly acid baths, also in peroxide or peracetic acid bleaching baths and in resin finishes	Good solubility in water. Stable to dithionite FASTNESS: On protein fibres, Light and Washing, moderate; on nylon, Light, good; Washing, fairly good
55	Reddish blue	ACETATE, NYLON and ACRYLIC FIBRES: From neutral to slightly acid baths	Substantive to silk, wool and cellulose. Compatible with cationic softeners FASTNESS: Chlorine, poor; Light, very good; Washing, moderate
56	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 61		
57		PROTEIN FIBRES, ACETATE and NYLON: From a neutral or weakly alkaline bath. Used for soaps, detergents and fats	Insoluble in water, soluble in organic solvents and fatty acids LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340
58		PROTEIN, ACETATE, NYLON and ACRYLIC FIBRES: From a neutral, weakly acid or weakly alkaline bath	Stable to peroxide and dithionite. May be used in discharge pastes and wash liquors LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
59	Slightly reddish blue	PROTEIN FIBRES and NYLON: From acid, neutral or alkaline baths. Applicable in chlorite, peroxide or peracetic acid bleaching baths and in caustic boil-offs on nylon CELLULOSE: From dye or detergent baths, stable in melamine resin finishes	FASTNESS: Chlorine, very good; Light, good; Washing, (cellulose) moderate, (nylon) very good
60	Cationic-nonionic complex Bluish violet	PROTEIN FIBRES, ACETATE and NYLON: From acid, neutral and alkaline baths	Stable to dithionite and peroxide
61	Aminocoumarin Bluish violet	WOOL, NYLON and ACETATE: From acetic acid bath In liquid household fine-fabric laundering compositions	Soluble in acidic aqueous solution and in alcohol
62		NYLON: From weakly acid bath, may be applied in the chlorite bleach	Excellent fastness to light
63	Triazinylaminostilbene Blue	CELLULOSE: From neutral or alkaline bath. Also used in detergents	Effect not cumulative on repeated laundering
64	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 28		
65		CELLULOSE: From neutral or weakly alkaline bath. Used in detergents and in alkaline peroxide wash liquors	Good fastness to washing LITERATURE Landolt, <i>Textil-Rundschau</i> , 8 (1953) 340
66	Stilbene Bluish violet	In soaps and the like	Sparingly soluble in water. Fastness (on the fibre) to chlorine good
67	Bistriazinylaminostilbene Blue (peak at 440 nm)	In soaps for laundering cotton	Sparingly soluble in water, disperses well in soap
68	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 61		
69	Coumarin Bluish violet	On all fibres from dry cleaning solvents, must be steamed after application	Soluble in hydrocarbons, chlorinated hydrocarbons, acetone and ethyl acetate
70	Stilbyl-naphthotriazole Bluish	Plastics	Very good fastness to light

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
71	Stilbene Bluish violet	In laundry compositions containing anionic or non-ionic detergents for use on cellulose	Water dispersible, stable to perborate but not to chlorine FASTNESS: Acid, poor; Alkali, very good; Chlorine, very good; Dithionite, very good; Peroxide, very good; Light, good
72	Stilbyl-naphthotriazole	Polyester fibres and in plastics	FASTNESS: Light, good; Washing, very good
73	Trimethyldihydropyridine Blue PREPARATION: BP 722791	Lacquers and waxes	Soluble in organic solvents, insoluble in water
74	45550 Xanthene Greenish yellow	Lacquers and Coatings and as a solvent dye, see C.I. Solvent Green 4	Soluble in organic solvents, insoluble in water LITERATURE BIOS 987, 185; 1433, 107 FIAT 1313, II, 61
75	Xanthene Green	Lacquers and Coatings and as a solvent dye, see C.I. Solvent Yellow 43	Soluble in organic solvents, insoluble in water
76	Naphthalimide Greenish blue	Lacquers and coatings	Insoluble in water and hydrocarbons, soluble in other organic solvents
77	Stilbene Reddish blue	Lacquers and coatings	Soluble in organic solvents, insoluble in water
78	Aminocoumarin Bluish violet	Lacquers, coatings, plastics, shellac, etc.	Soluble in organic solvents, insoluble in water
79		CELLULOSE	Good fastness to acid, alkali and chlorine
80	Yellowish green	CELLULOSE: Especially for shading in combination with other fluorescent brighteners	
81		CELLULOSE: From a detergent bath	Good fastness to acid, alkali and chlorine
82	Stilbene	CELLULOSE: Suitable for machine dyeing	FASTNESS: Acid, good; Alkali, excellent; Heat, good; Light, good
83	Stilbene Bluish	CELLULOSE, PROTEIN FIBRES and NYLON: From a neutral or weakly acid bath	Poor fastness to chlorine; stable to dithionite and peroxide

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
84	Bistriazinylaminostilbene Bluish violet	CELLULOSE and PAPER: From a neutral, alkaline or soap bath. Has good exhaustion from a cold soln. Also for soaps and detergents	Good solubility in water and good fastness to chlorine, light, peroxide and washing
85	Bistriazinylaminostilbene Bluish violet	CELLULOSE and PAPER	
86	Bistriazinylaminostilbene Bluish violet	CELLULOSE and PAPER: From a neutral, alkaline or soap bath. Has good exhaustion from a cold solution. Also for soaps and detergents	Good solubility in water and good fastness to chlorine, light, peroxide and washing
87	Bistriazinylaminostilbene Bluish violet	CELLULOSE and PAPER. From a neutral or weakly acid bath, levels well and has good exhaustion from a cold solution. Suitable for padding. Also for soaps and detergents	Very good solubility in water. Fastness to chlorine, light, peroxide and washing good
88	This C.I. Generic Name is discontinued, the fluorescent brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 24		
89	This C.I. Generic Name is discontinued, the fluorescent brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 52		
90	Bistriazinylaminostilbene Bluish violet	CELLULOSE and PAPER: From a neutral, alkaline, soap or weak acid bath NYLON: From a neutral or weakly acid bath at 60-90°C. Exhaustion good. Also for soaps and detergents	Fairly soluble in water. Good fastness to chlorine, light and peroxide
91	Coumarin Bluish violet	WOOL, SILK and SYNTHETIC RESINS: From aqueous dispersion	Very good solubility in organic solvents, poor solubility in water. Moderately fast to light and washing
92	This C.I. Generic Name is discontinued, the brightener formerly listed under it now appears under C.I. Fluorescent Brightener 84		
93	This C.I. Generic Name is discontinued, the brightener formerly listed under it now appears under C.I. Fluorescent Brightener 24		
94	Stilbene (triazinyl deriv.) Bright blue	CELLULOSE	
95	This C.I. Generic Name is discontinued, the brightener formerly listed under it now appears under C.I. Fluorescent Brightener 85		

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
96	This C.I. Generic Name is discontinued, the brightener formerly listed under it now appears under C.I. Fluorescent Brightener 85		
97	Deriv. of 4,4'-bistriazi nyl-aminostilbene-2, 2'-disulphonic acid Bright blue	CELLULOSE	
98	Stilbene Blue	CELLULOSE: Especially during laundering	Soluble in water but not in organic solvents FASTNESS: Alkali, very good; Chlorine, good; Dithionite, very good; Light, 3; Peroxide, very good; Washing, very good
99	Stilbene Blue	CELLULOSE and PAPER	Soluble in water, insoluble in organic solvents FASTNESS: Acid, good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, 3; Peroxide, very good; Washing, very good
100	Stilbene Reddish blue	CELLULOSE, PROTEIN FIBRES, NYLON and PAPER	Soluble in water, insoluble in organic solvents FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, 3 (cotton), 3-4 (nylon); Peroxide, very good; Washing, good
101	Reddish blue	ACRYLIC FIBRES: From acetic or formic acid bath	FASTNESS: Acid, very good; Alkali, good; Chlorine, good; Dithionite, good; Light, moderate; Peroxide, moderate; Washing, good
102	Stilbene Greenish	PAPER: By surface application with size and alum at pH as low as 4	Soluble in water to yield stable solutions. Stable to alum
103	Stilbyl-s-triazine Slightly bluish	CELLULOSE	
104	Bistriazinylaminostilbene Bluish violet	WOOL, SILK and NYLON: From a neutral or weakly acid bath, exhaustion good at 70-90°C CELLULOSE-WOOL and CELLULOSE-NYLON UNIONS: From a weakly acid bath PAPER	Very good solubility in water FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, very good; Peroxide, good; Washing, good
105	Stilbene (triazinyl deriv.) Bluish white	CELLULOSE, NYLON and PAPER: Slow exhausting, non-feathering and alum resisting on paper	Miscible in water in all proportions, insoluble in petroleum solvents FASTNESS: Acid, good; Alkali, good; Chlorine, poor; Dithionite, very good; Light, good
106	This C.I. Generic Name is discontinued		
107	Stilbene Bright greenish blue	CELLULOSE: Exhausting by addition of salt	Levels well

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
108	Stilbene Blue	CELLULOSE: Add salt to aid ex- haustion. Suitable for pad- ding	Levels well
109	Stilbene Blue	PAPER: At low pH in the beater or on size press levels well	Very good solubility in water
110	Stilbene Bright greenish blue	PAPER: In beater	Water soluble. Insensitive to pH change
111	4,4'-Diaminostilbene-2,2'- disulphonic acid deriv. Bluish violet	CELLULOSE and NYLON: By exhaustion with addition of sodium sulphate, substantivity little affected by temperature PAPER in the pulp or in coat- ings. Also for soaps and deter- gents	Soluble in water, anion-active FASTNESS: Acid, sensitive; Chlorine, moderate; Dithionite, good; Light, very good; Washing, good
112	Coumarin Blue	ACETATE: At 80°C and pH 5-7 TRIACETATE: At 95°C and pH 3-4. ACRYLIC and POLYESTER: At pH 3 if desired in presence of chlorite	Soluble in hot water FASTNESS: Acid, very good; Alkali, very good; Chlorine, very good; Dithionite, very good; Light (acetate) very good, (acrylic) poor; Peroxide, very good; Washing, very good
113	Stilbene Bright bluish violet	CELLULOSE: By exhaustion from a neutral or alkaline bath, es- pecially from a peroxide bleach ing bath. Also in discharge pastes	Water soluble FASTNESS: Acid, moderate; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good; Washing, very good
114	Stilbene Bluish violet	CELLULOSE: By exhaustion or padding at pH 3-11, using common salt to complete ex- haustion NYLON: At 60-130°C and pH 4-5	Water soluble FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good; Washing, good
115	Stilbene Bluish violet	CELLULOSE: By exhaustion or padding at pH 5-11, especially suitable for goods to be per- oxide bleached	Water soluble FASTNESS: Acid, moderate; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good; Washing, good
116	Stilbene Blue	PAPER: By addition to pulp and in coatings	FASTNESS: Acid, moderate; Alkali, moderate; Di- thionite, very good; Light, good; Peroxide, very good
117	Stilbene Blue	PAPER: By addition to pulp and in coatings	Water soluble, insoluble in organic solvents FASTNESS: Acid, good; Alkali, moderate, Dithion- ite, very good; Light, good; Peroxide, very good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
118	Stilbene Bluish green	CELLULOSE: By exhaustion or padding at pH 2-11 using common salt to complete exhaustion. Applicable in liquors containing chlorine or chlorite	Water soluble FASTNESS: Acid, very good; Alkali, very good; Chlorine, very good; Dithionite, very good; Light, good; Peroxide, very good; Washing, moderate
119	Stilbene Reddish violet	CELLULOSE: By exhaustion or padding at pH 2-11 NYLON: At 80°C and pH 4-5	Water soluble FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good; Washing, good
120	This C.I. Generic Name is discontinued, the fluorescent brightener formerly listed under it now appears under C.I. Fluorescent Brightener 104		
121	Stilbene Bright bluish violet	ACETATE, TRIACETATE, NYLON and ACRYLICS: By exhaustion from a neutral or weakly acid aqueous dispersion	FASTNESS: Acid, very good; Alkali, very good; Light (acrylic) very good, (acetate and nylon) good; Washing, very good
122	This C.I. Generic Name is discontinued		
123	Morpholine Bright bluish		
124	Pyrazolone Bluish	SOAP	
125	Stilbene (triazinyl deriv.) Slightly reddish blue	CELLULOSE: By exhaustion or padding, using common salt to complete exhaustion	Miscible with water in all proportions FASTNESS: Acid, very good (but pptd from soln at pH below 4-5); Alkali, excellent; Chlorine, very good; Dithionite, excellent; Light, good; Peroxide, very good; Washing, good
126	Stilbene Bluish violet	CELLULOSE and PAPER: From aqueous solution	FASTNESS: Acid, very good; Alkali, good; Chlorine, moderate, Dithionite, good; Light, poor; Peroxide, good; Washing, good
127	Stilbene Bluish violet	CELLULOSE, SILK and ACETATE: From aqueous solution	FASTNESS: Acid, very good; Alkali, good; Chlorine, moderate; Dithionite, good; Light, poor; Peroxide, good; Washing, good
128	Stilbene Bluish violet	CELLULOSE, SILK, ACETATE and PAPER	Soluble in alcohols, glycols, Cellosolve and triethanolamine FASTNESS: Acid, Alkali, Dithionite, Peroxide and Washing, good; Chlorine, moderate; Light, poor
129	Stilbene Bluish violet	CELLULOSE, SILK, NYLON and ACETATE: From aqueous solution	FASTNESS: Acid, good; Alkali, good; Chlorine, moderate; Dithionite, good; Peroxide, good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
130	Coumarin Violet	PROTEIN FIBRES, NYLON, ACETATE and ACRYLICS	Insoluble in water, soluble in alcohol, glycols and Cellosolve FASTNESS: Acid, good; Alkali, good; Chlorine, moderate; Dithionite, good; Light, poor; Peroxide, good; Washing, good
131	Stilbene Bluish violet	CELLULOSE, SILK and ACETATE: From aqueous solution	FASTNESS: Acid, good; Alkali, good; Chlorine, moderate; Dithionite, good; Light, poor; Peroxide, good; Washing, good
132	Stilbene Blue	CELLULOSE, SILK, ACETATE and ACRYLICS	Soluble in glycols and Cellosolve FASTNESS: Acid, poor; Alkali, very good; Chlorine, very good; Hydrosulphite, very good; Light, good; Peroxide, very good; Washing, very good
133	Heterocyclic Blue	ACRYLIC STAPLE FIBRE: By exhaustion or padding; also from acid-activated chlorite bleach liquor	Very good fastness to light and washing
134	Stilbene Blue	CELLULOSE: From dyebath or finish NYLON and WOOL	Good solubility in water. Stable to acids, peroxide bleach liquors and reducing agents FASTNESS: Chlorine, good; Light, good; Washing, very good
135	Heterocyclic Reddish blue	POLYESTER: By exhaustion or padding ACETATE, NYLON and POLY-VINYL FIBRES	Excellent fastness to light and very good fastness to washing on polyester. Stable in chlorite bleach liquors and peracetic acid
136	Stilbene Reddish blue	PAPER and CELLULOSE: Highly substantive especially to bleached pulp	Very good solubility in water. Good stability to acid and alkali
137		CELLULOSE, ACETATE and NYLON: Especially in washing liquors	Limited build up on repeated use. Good stability in hypochlorite and peroxide liquors
138		CELLULOSE: Especially in washing liquors	Good fastness to chlorine and good stability to acid
139		CELLULOSE: Especially in washing liquors	Considerable build up on repeated use. Good fastness to chlorine and good stability to salts. Withstands normal spray temperatures when incorporated in soap or detergents
140	Heterocyclic Blue	WOOL, SILK, ACETATE and NYLON: Especially in washing liquors SOAPS and DETERGENTS: To improve appearance	Good stability to salts. Withstand normal spray temperatures

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
141		WOOL, SILK, ACETATE and NYLON: Especially in washing liquors SOAPS and DETERGENTS: To improve appearance	Good stability to salts. Withstand normal spray temperatures
142		CELLULOSE: From a neutral or weakly alkaline bath	Good fastness to washing and stability to dithionite and peroxide
143	Stilbene Bright blue	CELLULOSE and PAPER: From alkaline or neutral baths; from peroxide bleaching baths	
144	Stilbene Bright blue	CELLULOSE: From washing liquors SOAPS and DETERGENTS	Aqueous solutions are unstable to light. Good fastness to chlorine, peroxide and washing
145	Stilbene Blue	CELLULOSE: From acid, neutral or alkaline baths. Particularly suitable for use in resin finishing and in durable press finishing. Addition of an electrolyte is necessary to obtain complete exhaustion. Surface coating of paper and board, especially in starch sizes	Excellent solubility in cold water. Stability to acids (and resin-catalyst combinations) excellent. Low substantivity. Levelling excellent FASTNESS: Acid, very good; Alkali, very good; Chlorine, moderate, Dithionite, very good; Light, good; Peroxide, very good; Washing, good
146	Stilbene Bluish violet		
147	Stilbene Bright reddish blue	CELLULOSE and PAPER: From a neutral or weakly alkaline bath or from peroxide bleaching bath	Very soluble in slightly warm water FASTNESS: Chlorine, fair; Light, good; Washing, excellent
148	Stilbene Reddish blue	NYLON: By exhaustion from acid aqueous solution. Suitable for use in package dyeing machines but not suitable for application by padding	Solutions are not stable to chlorine or chlorite FASTNESS: Chlorine, good; Light, good; Washing, very good
149	Bistriazinylaminostilbene	PAPER: By surface staining or beater dyeing to obtain high whites CELLULOSE: In resin finishes	Readily soluble in water and very resistant to acid conditions. On paper its fastness to light is only moderate but it is resistant to chlorine, acid and alkali
150	Heterocyclic Blue	WOOL, COTTON and NYLON and their mixtures. From aqueous solution at 80–160°F	Has both reducing and brightening properties. It is extremely sensitive to acid. Fastness to light and washing is good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
151	Triazinylaminostilbene Reddish blue	CELLULOSE: In the dyebath, in peroxide bleaching baths and in resin finishes WOOL: Used together with a reducing agent NYLON: In the dyebath or by the pad-steam process	Soluble in water, ethylene- and diethyleneglycol and Cellosolve. Insoluble in benzene, chlorobenzene, ether, chloroform and acetone FASTNESS: Acid, very good; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good
152	Coumarin Greenish blue	NYLON, ACETATE, POLYESTER: From a dyebath or by the Thermosol or pad-steam processes	Insoluble in water, soluble in benzene, chlorobenzene, acetone and Cellosolve FASTNESS: Acid, very good; Alkali, good; Chlorine, good; Dithionite, very good; Light, very good; Peroxide, good
153	Triazinylaminostilbene Blue	CELLULOSE: From aqueous solution, peroxide baths or in resin finishes WOOL: From aqueous solution in presence of a reducing agent NYLON: From aqueous solution Also used in detergent compositions	Soluble in water, ethylene and diethylene glycols and Cellosolve. Insoluble in benzene, chlorobenzene, ether, chloroform and acetone FASTNESS: Acid, poor; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good
154	Triazinylaminostilbene Blue	CELLULOSE: From aqueous solution, peroxide baths or in resin finishes WOOL: From aqueous solution in presence of a reducing agent NYLON: From aqueous solution PAPER: In the pulp or in latex-casein-clay coatings	Compatible with cationic softeners. Soluble in water, ethylene and diethyleneglycol and Cellosolve. Insoluble in benzene, chlorobenzene, ether, chloroform and acetone FASTNESS: Acid poor; Alkali, very good; Chlorine, good; Dithionite, very good; Light, good; Peroxide, very good
155	45555 Coeroxene Greenish	LUBRICATING OILS	Soluble in hydrocarbons, the solutions being stable to heat and light. Also soluble in alcohols, esters, ketones and plasticisers
156	Coumarin Blue	NYLON, ACETATE and POLYESTERS: From aqueous dispersion or by the Thermosol or pad-steam processes	Insoluble in water, soluble in benzene, chlorobenzene, chloroform, acetone and Cellosolve FASTNESS: Acid, very good; Alkali, moderate-good; Chlorine, very good; Dithionite, good; Light, very good; Peroxide, moderate-good
157	Coumarin Greenish blue	ACETATE, TRIACETATE and ACRYLICS: From aqueous dispersion	Insoluble in water, soluble in benzene, chlorobenzene, chloroform, acetone, Cellosolve and dioxan Stable to chlorite FASTNESS: Acid, very good; Alkali, good; Chlorine, very good; Dithionite, very good; Light, good; Peroxide, good
158	Triazole Reddish	ACRYLICS: From a finishing or bleaching bath	Excellent stability to chlorite and excellent fastness to light
159	Azole Bluish	ACRYLICS: From a finishing or bleaching bath	Excellent stability to chlorite and excellent fastness to light

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
160	Benzidine sulphone Greenish blue	NITROCELLULOSE, CELLULOSE ACETATE BUTYRATE and CHLORINATED RUBBER VAR- NISHES	Insoluble in water; very soluble in methanol, Methyl Cellosolve, butanol and tetrahydrofurfuryl alcohol; soluble in methyl ethyl ketone and acetone; slightly soluble in toluene and ethyl acetate Fastness to daylight good and to artificial light excellent
161	Stilbene Reddish	PAPER: In beater dyeing, cal- ender staining, surface and tub sizing or in coating composi- tions	Exhausts slowly, has good fastness to alum and is non-feathering. Fluorescence little affected between pH 4.5-6. Used in paper coating compositions it is satisfactory at pH up to 9
162	Naphthalic acid deriv. Blue	POLYESTER, ACRYLICS and ACETATE: To impart a neutral white effect	Usable at pH 3-11 and stable to chlorite. Excellent fastness to light, washing, perspiration and heat
162:1	Chemically identical with C.I. Fluorescent Brightener 162 but somewhat different in physical properties	POLYESTER-COTTON BLENDS	
163	This C.I. Generic Name is discontinued, the fluorescent brightener formerly listed under it now appears under C.I. Fluorescent Brightener 162:1		
164	Naphthalic acid deriv. Blue	POLYESTER, ACRYLICS and ACETATE: To impart a slight bluish white effect	Usable at pH 3-11 and stable to chlorite. Excellent fastness to light, washing, perspiration and heat
165	Stilbene Reddish blue	PAPER: Added direct to the pulp at the beater or in coatings	Readily soluble in cold water. Stable to acid, alum and rosin. Good build-up
166	Stilbene Bright greenish blue	CELLULOSE and PAPER: Good exhaustion from neutral, alk- aline or soap baths SOAPS and DETERGENTS	Very good solubility in water. Stripping with chlorite good
167	Stilbene Bright reddish	CELLULOSE and PAPER: From neutral or weakly acid baths. Levelling and exhaustion good from cold solutions. Suitable for application by padding. Good compatibility with resin liquors	Good solubility in water. Good fastness to chlorine, light, peroxide and washing
168	Stilbene Bright blue	CELLULOSE and PAPER: From neutral, weakly acid or soap baths; moderate exhaustion and good levelling from cold solutions. Suitable for applica- tion by padding or in resin liquors SOAPS and DETERGENTS	Very good fastness to chlorine and good fastness to light, peroxide and washing

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
169	Stilbene Bright reddish violet	CELLULOSE and PAPER: From a neutral, weakly acid or soap bath. Good levelling and exhaustion from a cold bath. Suitable for padding. Good compatibility with resin liquors	Good fastness to chlorine, light, peroxide and washing
170	Oxazole Bluish	POLYESTER: From aqueous dispersion	Insoluble in water, soluble in ethanol
171	Oxazole Bluish	NYLON, TRIACETATE and POLYESTER: Good substantivity from aqueous dispersion	Good fastness to acid and light, very good fastness to alkali, chlorine, dithionite and peroxide
171:1	Chemically identical with C.I. Fluorescent Brightener 171 but is soluble in many organic solvents		
172	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 185:1 and 185:2		
173	Stilbene Bright bluish	CELLULOSE and PAPER: Good exhaustion from a neutral, alkaline or soap bath SOAPS and DETERGENTS	Good solubility in water. Good fastness to chlorine, light, peroxide and washing
174	Stilbene Greenish blue	CELLULOSE and PAPER: Can be used in resin finishes and paper sizes	Readily soluble in cold water. Fastness: chlorine, poor; washing, excellent
175	Stilbene Bluish	CELLULOSE and PAPER	Water soluble. Low substantivity
176	Stilbene Reddish blue	CELLULOSE and DETERGENTS	Water soluble. Low substantivity
177	Stilbene Bluish	CELLULOSE	Water soluble. Excellent fastness to chlorine
178	Stilbene Bluish	WOOL and NYLON: From an acetic or formic acid bath	Water soluble

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES																																																																																								
179	Triazine Bluish (acetate, acrylic, triacetate) Greenish blue (nylon)	From aqueous dispersion by any method suitable for dis- perse dyes or from a chlorite bleaching bath	<p>Stable to peroxide, salt, sodium carbonate, sulph- onic acid, anionic and non-ionic surfactants and some cationic surfactants. Not dischargeable</p> <table><tr><td>FASTNESS (ISO)</td><td>Acetate</td><td>Acrylic</td><td>Nylon</td></tr><tr><td>Sulphuric acid</td><td>—</td><td>5</td><td>5</td></tr><tr><td>Alkali</td><td>—</td><td>5</td><td>5</td></tr><tr><td>Chlorite bleaching</td><td>—</td><td>4</td><td>5</td></tr><tr><td>Hot pressing, dry (180°C)</td><td>4</td><td>5(150°C)</td><td>5</td></tr><tr><td>Light, normal</td><td>6</td><td>6</td><td>4-5</td></tr><tr><td>Sodium peroxide</td><td>5</td><td>—</td><td>5</td></tr><tr><td>Peracetic acid</td><td>—</td><td>—</td><td>4</td></tr><tr><td></td><td></td><td></td><td>(greener)</td></tr><tr><td>Dithionite + alkali</td><td>—</td><td>5</td><td>5</td></tr><tr><td>Perspiration</td><td>5</td><td>5</td><td>5</td></tr><tr><td>Washing (1)</td><td>5</td><td>5</td><td>5</td></tr><tr><td>Washing (4)</td><td>—</td><td>5</td><td>4</td></tr></table> <table><tr><td>FASTNESS (ISO)</td><td>Polyester</td><td>Triacetate</td></tr><tr><td>Sulphuric acid</td><td>5</td><td>5</td></tr><tr><td>Alkali</td><td>5</td><td>5</td></tr><tr><td>Chlorite bleaching</td><td>3-4</td><td>—</td></tr><tr><td>Hot pressing, dry (180°C)</td><td>5</td><td>5</td></tr><tr><td>Light, normal</td><td>5</td><td>6</td></tr><tr><td>Sodium peroxide</td><td>5</td><td>5</td></tr><tr><td>Peracetic acid</td><td>—</td><td>—</td></tr><tr><td>Dithionite + alkali</td><td>—</td><td>5</td></tr><tr><td>Perspiration</td><td>5</td><td>5</td></tr><tr><td>Washing (1)</td><td>5</td><td>5</td></tr><tr><td>Washing (4)</td><td>4</td><td>5</td></tr></table>	FASTNESS (ISO)	Acetate	Acrylic	Nylon	Sulphuric acid	—	5	5	Alkali	—	5	5	Chlorite bleaching	—	4	5	Hot pressing, dry (180°C)	4	5(150°C)	5	Light, normal	6	6	4-5	Sodium peroxide	5	—	5	Peracetic acid	—	—	4				(greener)	Dithionite + alkali	—	5	5	Perspiration	5	5	5	Washing (1)	5	5	5	Washing (4)	—	5	4	FASTNESS (ISO)	Polyester	Triacetate	Sulphuric acid	5	5	Alkali	5	5	Chlorite bleaching	3-4	—	Hot pressing, dry (180°C)	5	5	Light, normal	5	6	Sodium peroxide	5	5	Peracetic acid	—	—	Dithionite + alkali	—	5	Perspiration	5	5	Washing (1)	5	5	Washing (4)	4	5
FASTNESS (ISO)	Acetate	Acrylic	Nylon																																																																																								
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180	This C.I. Generic Name is discontinued																																																																																										
181	Heterocyclic Bluish → reddish blue	ACRYLICS and their blends with other fibres. Suitable for application from a chlorite bleaching bath	Outstanding fastness to light and washing																																																																																								
182	Triazinylaminostilbene Bluish	Mass brightening of NYLON. Added either during polymer- isation or dry blended with the nylon granules																																																																																									
183	Triazinylaminostilbene Blue	CELLULOSE: By padding or in a resin liquor NYLON: Preferably by an ex- haustion method, especially at high temperature	Good fastness to light and washing																																																																																								
184	Heterocyclic Bluish	ACETATE, POLYVINYL CHLOR- IDE) and TRIACETATE: By addition to the dope before extrusion POLYESTER: By addition during polymerisation or dry blend- ing with the granules POLYPROPYLENE: By dry blend- ing with the granules																																																																																									
184:1	Chemically identical with C.I. Fluorescent Brightener 184 but is extended with chalk to facilitate its dispersion in plastics																																																																																										

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
184:2	Chemically identical with C.I. Fluorescent Brightener 184 but contains a softening agent	Plasticised transparent or opaque poly(vinyl chloride)	
185	Thiophene oxazole Bluish	ACETATE, NYLON, POLYESTER, POLYPROPYLENE, POLY(VINYL CHLORIDE) and TRIACETATE By exhaustion, pad-thermofix etc. preferably by high-temperature application. May be used in chlorite, dithionite and peroxide bleaching baths	Outstanding fastness to chlorine, light and washing on polyester fibres
185:1	Thiophene oxazole Bright bluish	POLYPROPYLENE: By exhaustion or a special padding method POLYESTER, POLYVINYL and NYLON	Stable in chlorite bleaching baths and peracetic acid FASTNESS: (polyester or polypropylene), light, excellent; organic solvents, very good; washing, excellent
185:2	Thiophene oxazole Bright reddish	POLYPROPYLENE: By exhaustion or a special padding method POLYESTER, POLYVINYL and NYLON	Stable in chlorite bleaching baths and peracetic acid FASTNESS: (polyester or polypropylene), light, excellent; organic solvents, very good; washing, excellent
186	Stilbene Blue	SOAPS and DETERGENTS of all types both to enhance their appearance and also that of textiles of all types cleansed by them	Must be dissolved to a clear solution in boiling water to obtain the maximum effect. Excellent fastness to acid and perspiration
187	Stilbene Bluish	PAPER: In coating compositions, on a size press and in paper stock intended for melamine-formaldehyde lamination	
188	Stilbene Bluish	In detergents to be used at the boil. Has good substantivity to cellulose and nylon and has a pure brightening effect even after repeated washing. Suitable for spray-dried, light-duty and universal detergents	
189	Heterocyclic Bluish	In detergents imparts good brightening to acetate, cellulose, nylon, polyester, polypropylene, poly(vinyl alcohol) and triacetate	Stable in washing liquors containing hypochlorite or chloroisocyanuric acid. Excellent fastness (on fibre) to acids, chlorine, light and washing
190	Heterocyclic Bluish	In detergents imparts good brightening to acetate, cellulose, nylon, polyester, polypropylene, poly(vinyl alcohol) and triacetate	Stable in washing liquors containing hypochlorite or chloroisocyanuric acid. Excellent fastness (on fibre) to acids, chlorine, light and washing

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
191	Stilbene Reddish violet	CELLULOSE and NYLON: Moderately substantive to cellulose, substantivity increased by electrolytes and lessens above 60°C. Highly substantive to nylon at pH 3-8 and above 60°C	Anionic. Stability (in soln), acid, very good; alkali, good; cationic softeners, pptd; chlorite, very good; dithionite, very good; heat, very good; hard water, pptd; hypochlorite, good at pH 10-12; peroxide, very good FASTNESS: (cellulose) chlorine, 5; light, 5, washing (60°C) 4; water, 3-4 (nylon) chlorine, 5; light, 5-6*; washing (60°C), 3; water, 5 *depending upon fibre type
192	Stilbene White	ACRYLIC: From aqueous solution at 80-100°C WOOL and SILK: From aqueous solution at 50-80°C	Cationic. Stable in solution to acid and dithionite, not stable to chlorine or chlorite FASTNESS: (acrylic) chlorine, 5; light, 5; washing (6) (100°C), 4-5; water, 5 (wool) chlorine & light, 2-3; washing (6) (100°C), 4-5; (silk) chlorine & light, 3; washing (6) (100°C), 4-5; water 5
193	4,4'-Diaminostilbene-2,2'-disulphonic acid deriv. Slightly reddish	PAPER: In surface coatings, particularly those based on starch	Good solubility in water, extremely good resistance to acid, little substantive to cellulose
194	Stilbene Bright blue	PAPER and CELLULOSE FIBRES: From alkaline or neutral baths, in acidic finishes or peroxide bleaching baths	Very soluble in water. Fastness to light good and to chlorine and washing very good
195	Stilbene Bright reddish blue	CELLULOSE: From aqueous solution, exhausts well at low temperature without addition of salt and may be padded	Good solubility in water. Stable to acids and reducing agents FASTNESS: Chlorine, moderate; Light, good; Washing, very good
196	Coumarin Reddish violet	PROTEIN FIBRES, ACETATE or NYLON: From a neutral or weakly acid bath. May be used in scouring liquors and peroxide bleaching baths. Exhausts at 30-40°C	Readily soluble in cold water FASTNESS: Light, moderate; Washing, moderate to good
197	Azacyanine Reddish blue	ACRYLIC at pH 3-4 and 100°C ACETATE and TRIACETATE at pH 4-7 and 70°C	Cationic. Good solubility. Stable to cationic softeners and peroxide, not stable to reducing agent. Can be used in chlorite bleaching baths FASTNESS: (acrylic) Light, 4-5; Washing, very good (acetate and triacetate) Light 3-4; Washing, good
198	Stilbene Greenish blue	POLYESTER at pH 3-4 and 100°C ACETATE, NYLON and TRIACETATE	Non-ionic. Good solubility. Stable to cationic softeners. Can be used in chlorite, peroxide and reduction bleaching baths FASTNESS: (acetate and triacetate) Heat, very good; Light, 3-4; Washing, very good (nylon) Heat, very good; Light, 4-5; Washing, very good (polyester) Heat, very good; Light 5-6; Washing, very good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
199	Stilbene Reddish blue	POLYESTER at pH 5 and 100–200°C ACETATE at pH 5 and 85–180°C NYLON and TRIACETATE at pH 5 and 100–190°C, must be alkaline cleared	Non-ionic. Good solubility. Stable to cationic softeners. Can be used in chlorite, peroxide and reduction bleaching baths FASTNESS: (acetate) Heat, very good; Light, 3–4; Washing, very good (nylon) Heat, very good; Light, 4–5; Washing, very good (polyester) Heat, very good; Light 5; Washing, very good
200	Stilbene Bluish violet	COTTON and COTTON-POLYESTER blends. In finishes with reactant resin precondensate and zinc nitrate as catalyst	Anionic. Sensitive to hard water and cationic softeners. Stable to acids, alkalies, dithionite and heat FASTNESS: Chlorine, 5; Light, 5; Washing, 4; Water, 3–4
201	Stilbene Bluish violet	ACRYLIC: From acid chlorite bleaching baths at 90–100°C	Cationic. Good solubility in water. Stable to cationic softeners and dithionite FASTNESS: Light 4; Washing (60°C), 5; Water, 5
202	Nitrogenous heterocyclic Reddish	ACRYLIC: From acid baths at 90–100°C or chlorite bleaching baths	Cationic. Good solubility in water. Unstable in neutral or alkaline baths FASTNESS: Light, 4; Washing (60°C), 5; Water, 5
203	Coumarin Bluish	PLASTICS: By dry mixing, dissolves during subsequent heat treatment RESINS, PLASTICISERS LACQUERS: Added in organic solvent solution Plasticised Poly(vinyl chloride) Polystyrene and Acetate	Insoluble in water, soluble in many solvents. Excellent resistance to heat, acid and alkali, n.p. 70°C FASTNESS: Light (transparent PVC film), 5–6; (white-pigmented PVC), 4–5
204	Stilbene Bluish violet	CELLULOSE at pH 7–11 especially in peroxide and high-temp. bleaching. Substantivity little effected by temperature and electrolytes COTTON-POLYESTER blends can be padded (30s at 190°C) NYLON-COTTON blends in a Blankit I (C.I. Reducing Agent 1:3) bath	Anionic. High substantivity, not dischargeable and difficult to strip. Not stable in solution to chlorine and chlorite bleaching baths FASTNESS: (on fibre) Chlorine, good; Washing and Water, excellent
205	Stilbene White	CELLULOSE: From detergents in cold or hand-warm aqueous solution	Anionic. Good solubility in boiling water, good dispersibility in cold water. Very good resistance to spray drying, alkalis and peroxides. Good substantivity. In solution unstable to chlorine but has good fastness on the fibre
206	Nitrogenous heterocyclic Reddish blue	ACETATE, NYLON and TRIACETATE: Medium substantivity from anionic, cationic or non-ionic detergents in neutral or alkaline solution	Non-ionic. Insoluble in water, readily dispersible in water in presence of detergents. Very good stability to spray drying, alkalis and peroxides. In solution unstable to chlorine but moderately stable on the fibre. Non-substantive to cellulose

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
207	Stilbene Bluish violet	NYLON: From neutral to moderately acid solution	Water soluble. Good substantivity. Fastness to acid, alkali, chlorine and light good and to dithionite and peroxide very good
208	Stilbene Reddish blue	CELLULOSE, SOAPS and DETERGENTS	Water soluble. Good substantivity. Fastness to acid and light good, to alkali, chlorine, dithionite and peroxide very good
209	Stilbene Reddish blue	PAPER: Added to stock or in surface coatings and sizes	Readily soluble in water. Stable to high concentrations of alum. Good substantivity. Fastness to chlorine and light good, to acid, alkali, dithionite and peroxide very good
210	Stilbene Blue	PAPER: Added to stock or in surface coatings and sizes with all types of adhesives or size	Readily soluble in water. Good substantivity. Fastness to chlorine and light good, to acid, alkali, dithionite and peroxide very good
211	Stilbene Blue	NYLON in neutral to acid media CELLULOSE: From acid to alkaline media and in resin and durable press finishes	Readily soluble in water. Moderate substantivity. Sensitive to electrolytes. Fastness to chlorine and light good, to acid, alkali, dithionite and peroxide very good
212	Stilbene Reddish blue	NYLON and PROTEIN FIBRES: From weakly acid to weakly alkaline media CELLULOSE: From neutral to alkaline media	Dispersible in cold water, soluble in hot water. High substantivity. Fastness to acid poor, to light good and to alkali, chlorine, dithionite and peroxide very good
213	Stilbene Reddish blue	CELLULOSE: From acid to alkaline media, in resin and durable press finishes NYLON and PROTEIN FIBRES: From moderately acid to weakly alkaline media PAPER: Added to stock and in surface coatings. Particularly resistant to acid conditions in stock	Readily soluble in water. Good substantivity. Fastness to chlorine and light good, to acid, alkali, dithionite and peroxide very good
214	Stilbene Reddish blue	CELLULOSE: From soaps and detergents	Readily soluble in water. Good substantivity. Fastness to chlorine and light good, to acid, alkali, dithionite and peroxide very good
215	Stilbene Reddish blue	NYLON: From weakly acid media CELLULOSE: In resin and durable press finishes	Soluble in water. Medium substantivity. Fastness to alkali, chlorine and light good, to acid and dithionite very good
216	Bistriazinylaminostilbene Reddish blue	CELLULOSE: From aqueous media and in resin finishes NYLON and PROTEIN FIBRES	Very good solubility in water. Fastness to dithionite and light good, to acid, alkali, chlorine and peroxide very good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
217	Pyrazoline Reddish blue	WOOL: From acid or reducing bleach baths NYLON	Good solubility in water. Fastness to alkali and light good, to acid, dithionite and peroxide very good
218	Bistriazinylaminostilbene Reddish blue	NYLON: From an acid bath WOOL and CELLULOSE	Good solubility in water. Fastness to light good, to acid, alkali, chlorine, dithionite and peroxide very good
219	Oxazole Reddish blue	POLYPROPYLENE: From acid, neutral and alkaline baths con- taining non-ionic surfactants NYLON: From acid baths con- taining a non-ionic surfactant ACETATE and POLY(VINYL CHLORIDE)	Insoluble in water but readily dispersed in cold water. Fastness to acid, alkali, chlorine, dithionite, light and peroxide very good
219:1	Oxazole Neutral	POLYPROPYLENE: Good level- ling and very good exhaustion in presence of suitable auxil- iaries POLYESTER, NYLON and POLY- (VINYL CHLORIDE)	Readily dispersible in water. Fastness to chlorine, sublimation and washing good and to light excellent
219:2	Oxazole Slightly reddish	POLYPROPYLENE: Good level- ling and very good exhaustion in presence of suitable auxil- iaries POLYESTER, NYLON and POLY- (VINYL CHLORIDE)	Readily dispersible in water. Fastness to chlorine, sublimation and washing good and to light excellent
220	Stilbene Bluish	PAPER: In size-press composi- tions, pigmented coatings and in the beater	Miscible with cold soft water in all proportions. Stable to alum and strong and weak acids and alkalis
221	This C.I. Generic Name is discontinued, the brighteners formerly listed under it now appear under C.I. Fluorescent Brightener 146		
222	Stilbene Bluish red	CELLULOSE and PAPER: By pad- ding or exhaustion methods or in resin finishes	Soluble in water. Fastness to chlorine poor, to acid, alkali, light and peroxide good and to dithionite very good
223	Bistriazinylaminostilbene Bright reddish blue	CELLULOSE and PAPER: From aqueous solution or in resin finishes NYLON	Good solubility in water. Fastness to acid, di- thionite and light good, to alkali, chlorine and per- oxide very good
224	Bistriazinylaminostilbene Neutral	CELLULOSE and PAPER: Good exhaustion from cold neutral, alkaline, soap or acid baths WOOL, NYLON from neutral or weakly acid baths at 60–90°C POLY(VINYL ALCOHOL)	Good solubility in water. Fastness to light good and to acid, alkali, chlorine, dithionite and peroxide very good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
225	Bistriazinylaminostilbene Neutral	CELLULOSE: From aqueous solution SOAPS and DETERGENTS NYLON	Slightly soluble in water. Fastness to dithionite, light and peroxide good, to alkali and chlorine very good
226	Acenaphthene Neutral	ACRYLIC: From an acid chlor- ite bath	Readily soluble in cold water. Very good fastness to acid, alkali, chlorine, dithionite, light and peroxide
227	Acenaphthene Bluish	POLYESTER: By high tempera- ture, Thermosol and carrier methods ACRYLIC: From acid chlorite bath ACETATE: With use of an anionic or non-ionic surfac- tant NYLON	Insoluble but readily dispersible in water. Very good fastness to acid, alkali, chlorine, dithionite, light and peroxide
228	Heterocyclic Bluish violet	ACETATE, ACRYLIC, NYLON, TRIACETATE	Insoluble in water. High substantivity. Fastness to chlorine poor, to acid, dithionite and peroxide good, to light very good and alkali excellent
229	Coumarin Neutral	POLYESTER: By exhaustion and Thermosol methods POLYESTER-COTTON blends by the Thermosol process	Non-ionic. Stable in solution and in the fibre to acid, alkali, chlorite, hard water, hypochlorite and reducing agents FASTNESS: dry cleaning 5, dry heat setting and pleating 5, gas fume fading 5, light 7, perspiration (acid) 5 (alk.) 5, sea water 5, washing (40, 60 and 95°C) 5, water 5
230	Bistriazinylaminostilbene Blue	PAPER and COTTON	Not stable to acids and electrolytes
231	Bistriazinylaminostilbene Blue	PAPER and CELLULOSE	Excellent solubility in water. Stable to acid and alkali. Heavy metal salts lessen the fluorescence
232	Bistriazinylaminostilbene Blue	PAPER	Stable to acid and alkali. Heavy metal salts lessen the fluorescence
233	Bistriazinylaminostilbene Brilliant Blue	Washing powders for cellulose and nylon textiles	Solubility in water at 100°C 10 mg/l. Stable to perborate and alkalis. Loses its fluorescence in warm liquors containing hypochlorite but on the fibre is negligibly affected by chlorine
234	Bistriazinylaminostilbene Reddish blue	NYLON and its blend with wool or cellulose WOOL	Soluble in hot water. Stable to acids and alkalis, not stable to chlorine
235	Bistriazinylaminostilbene Very brilliant blue	PAPER: In the size-press	Stable to acids and alkalis but heavy metal salts reduce the fluorescence

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
236	Coumarin Blue	POLYESTER: By mass coloration	Soluble in hot organic solvents. Stable to acids and alkalis
237	This C.I. Generic Name is discontinued, the brightener formerly listed under this number now appears under C.I. Fluorescent Brightener 222		
238	Naphthalimide Violet	ACRYLIC (except for Courtelle where exhaustion is difficult above 0.8% concentration) particularly from chlorite bleaching baths or boiling aqueous dispersions	Cationic. Because it is a solution in strong sulphuric acid due precautions must be taken in using it FASTNESS: Light, 5-6; Heat (30s at 180°C) 4-5; Steam (at 108°C) 5; Washing (ISO 3) 5 (staining of acrylic 5, wool 5), water 5 (staining of acrylic 5, wool 5)
239	Bistriazinylaminostilbene Bluish violet	PAPER, CELLULOSE, PROTEIN FIBRES, NYLON	Readily soluble in cold water. Fastness to chlorine moderate, to alkalis and light good, to acid, dithionite and peroxide very good
240	Bistriazinylaminostilbene Bluish violet	WOOL, NYLON, PAPER, CELLULOSE from a neutral or weakly alkaline bath	Very good solubility in hot water. Good compatibility with cationic compounds in detergent compositions. Fastness to chlorine moderate, to acid, alkali and light good, to dithionite and peroxide very good
241	Bistriazinylaminostilbene Bluish violet	PAPER and in detergents for Wool, Nylon and Cellulose	Solubility in water 10 g/l at 75°C. Exhausts well on cellulose from cold solution. Fastness to chlorine moderate, to light good and to acid, alkali, dithionite and peroxide very good
242	Bistriazinylaminostilbene Bluish violet	WOOL, NYLON, PAPER. Cellulose from a resin bath	Fastness to chlorine moderate, to alkali and light good and to acid, dithionite and peroxide very good
243	40619 Bluish	CELLULOSE: From alkaline bath or by padding and in discharge printing	Soluble in water
244	Stilbene Bluish	CELLULOSE: From alkaline bath—especially in peroxide bleaching baths	Slightly soluble in water
245	40615 Greenish blue	NYLON: From weakly acid bath	Slightly soluble in water. Fast to thermofixation.
246	Stilbene Bluish	CELLULOSE: From alkaline bath NYLON: Padding or by exhaustion from a weakly acid bath	Soluble in water. Fast to thermofixation.
247	Stilbene Bluish	VISCOSE: Mass coloration or from alkaline bath or by padding	Does not affect the viscosity, stability or the filtration and extrusion properties of viscose solution

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
248	Stilbene Bluish	ACRYLIC and NYLON: Mass coloration	Soluble in water. Fast to thermofixation
249	Stilbene Reddish	CELLULOSE: Padding, especi- ally in resin finishes. Also from alkaline bath PAPER: In coatings	Soluble in water
249:1	Stilbene Reddish	PAPER: In size added to pulp	
250	Stilbene Bluish	CELLULOSE: From soap or de- tergent	Excellent fastness to alkali and perborates
251	Stilbyl-s-triazine Bluish	CELLULOSE	
252	Stilbyl-s-triazine Bluish	CELLULOSE	
253	Stilbyl-s-triazine Bluish	POLYACRYLONITRILE and WOOL	
254	Coumarinyl-pyrazole Reddish	POLYESTER	
255	Stilbyl-s-triazine Slightly bluish		
256	Stilbyl-s-triazine Reddish		
257	Coumarin Reddish	ACRYLIC if desired in a chlorite bleaching bath or together with cationic softening agents. High substantivity, optimum rate of uptake at 70°C and pH 3-4	In solution is not resistant to hypochlorite, peroxide and alkalis but on the fibre has very good resistance to them. Very good resistance both in soln and on the fibre to dithionite, acids and hard water FASTNESS: Light 4; Water 4; Washing 40°C 5, 95°C 4; Gas Fume Fading, Sea Water, Dry Clean- ing, Setting at 180°C and Perspiration 5. Solubility 100 g/l at 100°C
258	Oxazole Bluish violet	POLYOLEFIN and POLYESTER: By exhaustion or a special padding method	Insoluble in water FASTNESS: Light, excellent; Washing, very good. Stable in chlorite bleaching baths
259	Oxazole Bluish	ACRYLIC: By exhaustion or in acid-activated chlorite bath	Soluble in water FASTNESS: Light, excellent; Water, very good

C.I. Fluorescent Brighteners

C.I. Fluorescent Brightener	C.I. Constitution Number or Chemical Class and Fluorescence	APPLICATION	PROPERTIES
260	Stilbene Bluish	CELLULOSE: From an alkaline or soap bath SOAPS and DETERGENTS	FASTNESS: Alkali, Chlorine, Dithionite, Peroxide and Washing, very good; Light, good
261	Stilbene Bluish	CELLULOSE: From neutral, alk- aline or soap bath SOAPS and DETERGENTS	FASTNESS: Acid, Chlorine, and Light, good; Alkali, Dithionite, Peroxide and Washing, very good
262	Stilbene Bluish	CELLULOSE: By exhaustion, or padding, or in resin finishes; addition of salt aids exhaustion	Very good solubility in water FASTNESS: Acid, Alkali, Dithionite and Peroxide, very good; Chlorine, Light and Washing, good

FOOD DYES

Colouring Matters for Foods

The colouring of foods may be by simple incorporation of a dye, usually dissolved in a suitable solvent, or by a staining process or very occasionally by a dyeing process as technically understood. Freedom from toxicity must obviously be the first consideration in the choice of colouring matters for foods. After that the properties commonly required are high solubility in water, alcoholic solvents, edible oils or other media of incorporation; freedom from reaction with other components of the foodstuff such as alkalis, acids, flavouring materials or preservatives; freedom from attack by bacteria; stability to light and heat; and aesthetically acceptable hue.

Azo dyes form the majority of the synthetic dyes used for colouring foods but they have to be supplemented from Triarylmethane and other chemical classes in order to obtain the violet, blue and green hues. A number of natural dyes are used among which the carotenes are of outstanding importance for the colouring of edible oils and fats.

Legislative control of the use of dyes in food

The possible harmful effects of colouring matters and all other additives to foods are a subject of public concern and a critical attitude to their use is to be observed in most countries. Accordingly there is increasing application of legislative control so as to restrict the use of colouring matters in foods to certain "permitted" items which have not shown any harmful effects when subjected to rigorous examination. An agreed international list of permitted colours is a possible eventual outcome but it does not exist at present although there is much common ground among the countries most concerned. In these circumstances it is essential that no sale or use of a dye for the colouring of food should be made until it has been ascertained from the appropriate authority or official publication that such use is permitted by the most recent legislation of the country of use. Moreover it must be noted that in most countries standards of purity have been specified which must be strictly observed while the USA goes further and requires that each batch of dye must be officially certified as satisfactory before it may be used in foods.

Selection of Dyes for listing as Food Dyes in the Colour Index

In conformity with the critical attitude towards Food Dyes this edition of the Colour Index has listed as C.I. Food Dyes only those which appear in the permitted lists of the U.K.^{1a}, b and c, the U.S.A.^{2a}, b, c and d, Western Germany³

and the European Economic Community. These lists have been chosen because it is in these countries that most critical attention has been given to the subject and there is much common ground between them. It is to be noted that several C.I. Food Dyes which appeared in the 2nd Edition have been discontinued in this 3rd Edition because they have in the interim been removed from permitted lists. The commercial names entered are restricted to those applied by the manufacturers to brands specially manufactured to the appropriate specification for use in foods. Where the same dye entity is offered commercially in brands for textile dyeing or other technical purposes reference is given to the C.I. Generic Name—usually a C.I. Acid or C.I. Solvent name—where the dyeing or other information will be found.

Fastness and other properties of Food Dyes

Hue. The hues quoted for C.I. Food Dyes have usually been judged in aqueous or other solution or on paper and take no account of any intrinsic colour the food may have or of the effects of processing; they must therefore be accepted as broad indications only.

Solubility. Good solubility is a desirable property in a food dye, the solvents of most interest being water, alcohols (especially ethanol and glycerol) and vegetable oils. The chemical nature of oil-soluble coal tar dyes is such that very few are free from toxic hazards but for some applications use can be made of dispersions of oil-insoluble dyes. In the tables which follow solubility in water, ethanol and vegetable oils is given. Where figures are quoted they record the maximum weight of the dye (g.) which when dissolved in 100cc of the hot solvent will remain dissolved when the solution is stored at room temperature. Such figures however are no more than an indication of what may be expected in practice when other substances, such as electrolytes, are present.

Fastness Properties

There are no generally accepted methods of testing the fastness of dyes for use in foods and no generally accepted standards of fastness. The descriptions given (on the scale poor, fair, good, very good, excellent) therefore must be taken as providing a general indication only of the kinds of application for which the dyes are suitable. The fastness to alkali is concerned chiefly with baked cereal products in which baking powders are used. Heat fastness also is chiefly concerned with baked products. The significance of fastness to fruit acids and to preservatives such as benzoic acid and sulphur dioxide will be obvious.

REFERENCES

- ^{1a} Ministry of Food. Food Standards Committee Report on Colouring Matters. Recommendations relating to the use of colouring matters in foods. London H.M.S.O. 1954
- ^{1b} Ministry of Agriculture, Fisheries and Food. Food Standards Committee Supplementary Report on Colouring Matters. Recommendations relating to the use of colouring matters in foods. London H.M.S.O. 1955

- ^{1c} Ministries of Agriculture, Fisheries and Food and of Health. Statutory Instrument 1966 No. 1203, Food and Drugs, Composition and Labelling. The Colouring Matter in Food Regulations 1966. London H.M.S.O. 1966
- ^{2a} U.S. Federal Security Agency. Food and Drug Administration Service and Regulatory Announcements: Food, Drug and Cosmetic No. 3. Coal-Tar Color Regulations, S.R.A., F.D.C. 3, issued September 1940
- ^{2b} U.S. Federal Food, Drug and Cosmetic Act and General Regulations for its Enforcement, S.R.A., F.D.C. 1, Revision 4, April 1955
- ^{2c} Federal Register 20 (16 Nov. 1955) 8492-95. (*Chem. Abs.* **50** (1956), 1222)
- ³ Deutsche Forschungsgemeinschaft, Fachkommission zur Bearbeitung des Lebensmittelfarbstoffproblems, Mitteilungen 1-6
Mitteilung 6, Zusammengestellt im Auftrage der Kommission von Priv. Doz. Dr. G. Hecht, Wuppertal-Elberfeld (1st December 1955) contains the recommended permitted list for Western Germany to which reference is given in the Colour Index Food Dye Section. Detailed reference is given to literature providing data on toxicity of dyestuffs and their admission as food colours in different countries
- ⁴ E.E.C. Proposed Directive 1966
- ⁵ Truhaut, R., *Annales Pharmaceutiques Françaises*, 1955 (**13**), 36, 87
These references summarise the regulations concerning the use of colouring matters in food in France and also the recommendations of the Paris (1954) meeting of a sub-committee of experts appointed under the Pacte à Cinq (Belgium, France, Gt. Britain, Holland and Luxemburg)
- ⁶ Hesse, B.C., Coal-Tar Colors Used in Food Products. U.S. Bureau of Chemistry, Bulletin 147, Feb. 10, 1912
- ⁷ Jacobs, M.B., *Synthetic Food Adjuncts*, D. Van Nostrand Co., Inc., New York, 1947
- ⁸ Calvery, H.O., Coal-Tar Colours: Their use in Foods, Drugs and Cosmetics. *Am. Journal of Pharmacy*, Sept., 1942
- ⁹ Report on Joint FAO/WHO Conference on Food Additives, Geneva, Sept. 19-22, 1955
- ^{9a} FAO/WHO Specifications for Identity and Purity of Food Additives. Vol. 11, Food Colours (Rome 1963)

C.I. Food	C.I. Constitution Number	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur dioxide	Water	Ethanol	Vegetable Oils			
Yellow 1				This C.I. Generic Name is discontinued											
Yellow 2	13015	Monoazo	Reddish Yellow	v. good (water)	v. good to 205	v. good	poor (reddens)	poor—fair	poor	4	vss	insol	General purpose		C.I. Acid Yellow 9
Yellow 3	15985	Monoazo	Bright Reddish Yellow→Yellowish Orange	v. good (water)	v. good to 205	fair (redder)	excellent	v. good	fair	10	vss	insol	Jams, canned foods, sugar confectionery, baked goods, soft drinks Standard BS 3340:1961	Sunset Yellow FCF	
Yellow 4	19140	Monoazo	Yellow	v. good (water)	excellent to 105 v. good to 205	good (redder)	excellent	excellent	excellent	6	ss	insol	General purpose Standard BS 3211:1960	Tartrazine	C.I. Acid Yellow 23
Yellow 5	18965	Monoazo	Bright Yellow	excellent (water)	v. good to 205	v. good	v. good	v. good	fair	s	ss	insol	General purpose Standard BS 3614:1963	Yellow 2G	C.I. Acid Yellow 17
Yellow 6				This C.I. Generic Name is discontinued											
Yellow 7				This C.I. Generic Name is discontinued											
Yellow 8	14270	Monoazo	Brownish Yellow	f. good (water)	good to 205	good (redder)	fair (redder)	excellent	excellent	ss (cold) s (hot)	0.8	insol	General purpose	Chrysoin	C.I. Acid Orange 6
Yellow 9				This C.I. Generic Name is discontinued											
Yellow 10				This C.I. Generic Name is discontinued											
Yellow 11				This C.I. Generic Name is discontinued											
Yellow 12	12740	Monoazo	Bright Yellow→Bright Reddish Yellow	as C.I. Solvent Yellow 18						insol	ss	s	Edible oils and fats	Oil Yellow XP	C.I. Solvent Yellow 18
Yellow 13	47005	Quinoline	Bright Greenish Yellow	good (water)	good to 105 fair to 205	poor	excellent	poor	excellent	s	ss	insol	General purpose	Quinoline Yellow	C.I. Acid Yellow 13

C.I. Food Orange 1—8, Red 1—4

C.I. Food	C.I. Constitution Number	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur-dioxide	Water	Ethanol	Vegetable Oils			
Orange 1	15970	Monoazo	Bright Reddish Orange	good (water)	v. good to 105 fair to 205	fair (redder)	good	good	fair (slightly yellower)	4 ss	insol	insol	General purpose	Orange RN	C.I. Acid Orange 12
Orange 2	15980	Monoazo	Bright Orange	good	v. good to 205	good	v. good	good	poor	s	—	insol	General purpose		
Orange 3	11920	Monoazo	Yellowish Orange	good (ethanol)	excellent to 205	fair	—	—	—	insol	0.2–0.3	s	Edible oils, fats and cheese	Oil Yellow GG	C.I. Solvent Orange 1
Orange 4	16230	Monoazo	Bright Yellowish Orange → Bright Orange	excellent (water)	fair to 205	fair (redder)	v. good	good	fair	6 ss	insol	insol	General purpose Standard BS 3612:1963	Orange G	C.I. Acid Orange 10
Orange 5	40800 75130	Carotenoid	Yellow → Orange							insol	—	s	Edible oils and fats	β-Carotene	C.I. Natural Yellow 26
Orange 6	40820	Carotenoid	Yellowish Pink → Yellowish Red							insol	ss	s	Edible oils and fats		
Orange 7	40825	Carotenoid	Orange → Yellowish Red							insol	ss	s	Edible oils and fats		
Orange 8	40850	Carotenoid	Orange							insol	vss	s	Edible oils and fats	Canthaxanthin	
Red 1	14700	Monoazo	Bright Yellowish Red → Red	good (water)	v. good to 205	poor	excellent	v. good	v. good	s	ss	insol	Colouring of cherries		
Red 2	14815	Monoazo	Red	good	good	good	good	good	good	s	—	insol	General purpose		
Red 3	14720	Monoazo	Red → Bluish Red	good (water)	good to 105 fair to 205	fair	v. good	good	fair	4 ss	ss	insol	Jams, cordials and sugar confectionery Standard BS 3343:1961	Carmoisine	C.I. Acid Red 14
Red 3:1	14720:1	Aluminium Salt													
Red 4	16045	Monoazo	Red	good (water)	good to 105 fair to 205	fair (duller)	good (bluer)	good	poor	1.4 ss	ss	insol	General purpose	Fast Red E	C.I. Acid Red 13

C.I. Food	C.I. Constitution Number	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur-dioxide	Water	Ethanol	Vegetable Oils			
Red 5	16150	Monoazo	Bright Yellowish Red → Bright Red	good (water)	v. good to 105 f. good to 205	v. good	v. good	v. good	good	2	ss	insol	General purpose and especially for fruit, confectionery and meat products Standard BS 3671:1963	Ponceau MX	C.I. Acid Red 26
Red 6				This C.I. Generic Name is discontinued											
Red 7	16255	Monoazo	Bright Yellowish Red → Bright Red	good (water)	v. good to 105 good to 205	good	good	good	fair	5	ss	insol	Sugar confectionery, cordials and jams Standard BS 3342:1961	Ponceau 4R	C.I. Acid Red 18
Red 8	16290	Monoazo		v. good	good	poor	v. good	v. good	good	s	ss	insol	General purpose		C.I. Acid Red 41
Red 9	16185	Monoazo	Bluish Red	good (water)	v. good to 105 fair to 205	fair (bluer)	v. good	good	fair	7	vss	insol	Canned goods, jams, mineral waters, sugar confectionery. Shading component in custard powders Standard BS 3341:1961	Amaranth	C.I. Acid Red 27
Red 9:1	16185:1	Aluminium Salt													
Red 10	18050	Monoazo	Bluish Red	excellent	good to 205	v. good	good	good	good	6	ss	insol	Sugar confectionery, meat products and jam for brilliant red shades Standard BS 3611:1963	Red 2G	C.I. Acid Red 1
Red 11	18055	Monoazo	Bluish Red							s	ss	insol	General purpose Standard BS 3780:1964	Red 6B	C.I. Acid Violet 7
Red 12	17200	Monoazo	Bluish Red	f. good (water)	v. good to 105 good to 205	good	v. good	v. good	good	s	insol	insol	General purpose and particularly in jams, jellies, sugar confectionery and cordials Standard BS 3610:1963	Red 10B	C.I. Acid Red 33

C.I. Food Red 13—16, Violet 1—3, Blue 1—3

C.I. Food	C.I. Constitution Number	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur-dioxide	Water	Ethanol	Vegetable Oils			
Red 13	14780	Monoazo	Bluish Red	fair (water)	v. good to 205	poor	excellent	excellent	fair	s	ss	insol	Baked cereal products	Red FB	C.I. Direct Red 45
Red 14	45430	Xanthene	Yellowish Pink→ Bright Bluish Red	fair (water)	good to 105 fair to 205	fair (blue)	poor (precipitated)	poor	good	2	2	insol	Glacé and maraschino cherries, meat products, confectionery and canned goods Standards BS 4138:1967 FAO/WHO No. 25	Erythro-sine BS	C.I. Acid Red 51
Red 14:1	45430:1	Aluminum Salt													
Red 15															
Red 16															
Violet 1															
Violet 2	42640	Triaryl-methane	Bright Violet	good	—	fair	<i>Acetic acid</i> good	—	—	s	s	insol	General purpose		C.I. Acid Violet 49
Violet 3	42580	Triaryl-methane	Bright Violet	poor	fair	fair	fair	fair	poor	s	s	insol	General purpose	Violet BNP	C.I. Acid Violet 21
Blue 1	73015	Indigoid	Blue	fair	fair to 105 poor to 205	poor	fair	poor	poor	s	insol	insol	Principally in sugar confectionery Standards BS 4143:1967 FAO/WHO No. 38	Indigo Carmine	C.I. Acid Blue 74
Blue 2	42090	Triaryl-methane	Bright Greenish Blue	good	excellent to 105 v. good to 205	good	v. good	v. good	v. good	20	s	insol	General purpose Used for green hues in combination with C.I. Food Yellow 4		C.I. Acid Blue 9
Blue 3															

C.I. Food	C.I. Con-stitution Num-ber	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur-dioxide	Water	Ethanol	Vegetable Oils			
Blue 4	69800	Anthra-quinone		—	—	—	—	—	—	insol	insol	—	As "blueing" agent for sugar	Indan-throne	C.I. Vat Blue 4
Blue 5	42051	Triaryl-methane		—	—	—	—	—	—	s	s	insol	General purpose	Patent Blue	C.I. Acid Blue 3
Green 1				This C.I. Generic Name is discontinued											
Green 2				This C.I. Generic Name is discontinued											
Green 3	42053	Triaryl-methane	Bluish Green	fair	—	poor (blue)	good	—	—	vs	s	insol	General purpose, including veget-able oils from aqueous solution and lecithin		
Green 4	44090	Triaryl-methane	Bluish Green	poor	excellent to 205	poor	good	good	good	vs	vss	insol	General purpose, chiefly as a com-ponent of pea greens and browns	Green S	C.I. Acid Green 50
Brown 1	Essentially a mix-ture of the sodium salts of 4,4'-(4,6-diamino- <i>m</i> -phenylenebisazo) dibenzenesulfonic acid and the sodium salt of 4-(4,6-diamino- <i>m</i> -tolylazo)benzene-sulfonic acid		Yellowish Brown	fair	good to 105	v. good	good	good	good	20	vss	insol	Basis for choc-olate brown shades generally and for colouring fish in brine without precipitation	Brown FK	—
Brown 2	Monoazo dye pro-duced by coupling diazotised naph-thionic acid with a mixture of (C.I. 75240 and C.I. 75660) maclurin and morin		Brown	fair	excellent to 205	v. good	v. good	good-v. good	good	15	insol	insol	Principally for baked cereal products, also for sugar confec-tionery and blanching powders	Chocolate Brown FB	—
Brown 3	20285	Disazo	Reddish Brown	good (water)	excellent to 205	v. good	v. good	v. good	fair	vs	ss	insol	Colouring vin-egar, in baked products and general purpose	Chocolate Brown HT	—

C.I. Food	C.I. Constitution Number	Chemical Class	Hue	FASTNESS						SOLUBILITY			Usage	Common Name	Textile or other Use
				Light	Heat °C	Alkalis	Fruit Acids	Benzoic Acid	Sulphur dioxide	Water	Ethanol	Vegetable Oils			
Black 1	28440	Disazo	—	fair—good	good	—	good	good	fair	s	ss	insol	General purposes Employed mostly in mixtures Standards BS 4354 (1968) Metric units. Black PN for use in foodstuffs FAO/WHO No. 441	Black PN	—
Black 2	27755	Disazo	—	fair—good	fair—good	—	fair—good	fair—good	fair	s	ss	insol	General purposes	Black 7894	—

NATURAL DYES WITH A FOOD USAGE

The natural dyes listed below, descriptions of which will be found in Volume 3, have uses as food dyes limited in some cases to particular localities or applications. Regulations concerning the use of natural dyes for the colouring of food vary from country to country and have not been taken into account in this list. Permitted uses in the U.K. are included in Appendix I (following page) and permitted uses in the U.S.A. are similarly included in Appendix II.

C.I. Natural Yellows	Numbers 3, 6, 17, 23, 25, 26, 27
C.I. Natural Oranges	Numbers 3, 4
C.I. Natural Reds	Numbers 2, 4, 8, 20, 22, 27, 28
C.I. Natural Green	Number 4
C.I. Natural Brown	Number 10

APPENDIX I

Dyes permitted for use in the UK

The lists on this and the following page give the common names of the coal-tar and other colours permitted for use in colouring foods under the regulations made by the Ministers of Agriculture, Fisheries and Food and of Health under the Food and Drugs Act 1955. The conditions of their use are detailed in Statutory Instrument 1966 No. 1203 Food and Drugs, Composition and Labelling, which came into force on 26th June 1967.

The lists also give the corresponding Colour Index Generic Names and Constitution Numbers where such apply.

Coal Tar Colours

Common Name of Colour	C.I. Food Name	C.I. Constitution Number	C.I. Generic Names for other applications
Amaranth	C.I. Food Red 9	C.I. 16185	C.I. Acid Red 27
Black PN (Brilliant Black PN)	Food Black 1	28440	—
Black 7984	Food Black 2	27755	—
Brown FK	Food Brown 1	—	—
Carmoisine	Food Red 3	14720	Acid Red 14
Chocolate Brown FB	Food Brown 2	—	—
Chocolate Brown HT	Food Brown 3	20285	—
Erythrosine BS	Food Red 14	45430	Acid Red 51
Fast Red E	Food Red 4	16045	Acid Red 13
Green S	Food Green 4	44090	Acid Green 50
Indigocarmine (Indigotine)	Food Blue 1	73015	Acid Blue 74
Oil Yellow GG	Food Orange 3	11920	Solvent Orange 1
Oil Yellow XP	Food Yellow 12	12740	Solvent Yellow 18
Orange G	Food Orange 4	16230	Acid Orange 10
Orange RN	Food Orange 1	15970	Acid Orange 12
Ponceau MX	Food Red 5	16150	Acid Red 26
Ponceau 4R	Food Red 7	16255	Acid Red 18
Red 2G	Food Red 10	18050	Acid Red 1
Red 6B	Food Red 11	18055	Acid Violet 7
Red 10B	Food Red 12	17200	Acid Red 33
Red FB	Food Red 13	14780	Direct Red 45
Sunset Yellow FCF	Food Yellow 3	15985	—
Tartrazine	Food Yellow 4	19140	Acid Yellow 23
Violet BNP	Food Violet 3	42580	Acid Violet 21
Yellow 2G	Food Yellow 5	18965	Acid Yellow 17

Other Colours

Common Name or Description of Colour	C.I. Generic Name	C.I. Constitution Number
	C.I.	C.I.
(1) Caramel	Natural Brown 10	—
(2) Carmine (the colouring matter prepared from cochineal)	Natural Red 4	75470
(3) The following colouring matters of vegetable origin:		
(a) any colouring matter natural to edible fruit or vegetables		
(b) Alkanet	Natural Red 20	75520/75530
(c) Annatto	Natural Orange 4	75120
(d) Carotene	Natural Yellow 26	75130
	Food Orange 5	40800
(e) Chlorophyll	Natural Green 3	75810
(f) Flavine	Natural Yellow 10	—
(g) Indigo	Natural Blue 1	75780
	Vat Blue 1	73000
(h) Orchil	Natural Red 28	—
(i) Osage orange	Natural Yellow 8	75660
(j) Persian berry	Natural Yellow 13	—
(k) Safflower	Natural Red 26	75140
(l) Saffron	Natural Yellow 6	75100
(m) Sandalwood	Natural Red 22	—
(n) Turmeric	Natural Yellow 3	75300
(o) The pure colouring principle of any of the colouring matters mentioned in the preceding paragraphs (a) to (n) inclusive, whether isolated from such colouring matters or produced synthetically		
(4) β -apo-8'-Carotenal and the ethyl ester of β -apo-8'-Carotenoic acid	Natural Oranges 7 and 8	40820/40825
(5) Canthaxanthin	Food Orange 8	40850
(6) Bole or iron oxide	Pigment Red 102	77015/77491
		77538
(7) Carbon black	Pigment Black 7	—
(8) Charcoal	Pigment Black 8	—
(9) Titanium dioxide	Pigment White 6	77891
(10) Ultramarine	Pigment Blue 29	77007
(11) Silver, gold or aluminium in leaf or powder form, for use solely for the external colouring of dragees and the decoration of sugar-coated flour confectionery	Pigment Metal 1 (Aluminium)	77000
	Pigment Metal 3 (Gold)	
(12) The aluminium and calcium salts (lakes) of any water-soluble colour mentioned in this list		77480

APPENDIX II

Dyes permitted for use in USA

The use of colour additives in the United States is controlled by the Food & Drug Administration of the U.S. Dept. of Health, Education and Welfare. The regulations covering colour additives are under the Federal Food, Drug and Cosmetic Act, Part 8, Title 21, Code of Federal Regulations.

The exact status of any colour can be obtained from the Food & Drug Administration or by perusal of the Federal Register.

At the present time, the dyes approved by the Food & Drug Administration are listed in three lists. One is the food list, two is the drug list and three is the cosmetic list. In each of these lists, some of the colours are subject to certification and some are exempt from certification. Some of the dyes have been given a permanent status; others are on a provisional list and further study may result in their becoming a permissible colour or may result in their disqualification.

Four tables have been prepared to assist in an understanding of the status of the various colourants at the time when this third edition of the Colour Index went to press. Table I is limited to food dyes. The ones which are subject to certification are listed first. Whether or not this is a permanent listing or provisional is indicated in the column headed "Status". A brief description of limitations is also given. This should not be used as the final word.

Reference should be made to the original code of federal regulations.

The colourants permissible for use in drugs are listed in two places, both Table 2 and Table 3. Again, the limitations are only suggestive of the law and reference should be made to the code of federal regulations if this is of interest.

The colourants permissible for cosmetic use are listed in two places, Table 3 and Table 4. It will be noted that a dye such as FD&C Blue No. 1 is permissible in all three end uses and therefore is listed three times, once under Table 1 where it has a permanent status for use in food, once under Table 2 where it has a permanent status for use in drugs and once in Table 4 where it has a provisional status for use in cosmetics. There is so much duplication in the lists for drugs and the list for cosmetics, that Table 3 has been prepared listing all dyes which are permissible in both. It is therefore necessary to consult both Table 2 and Table 3 for drug use and both Table 3 and Table 4 for cosmetic use. This has been done to conserve space.

These tables provide summaries only and should not be taken as a legal basis because considerable liberties have been taken in considering the uses and restrictions. A full and complete description of the uses and restrictions may be found in the Federal Register. Also, since these are currently under study, their status will be changing as time goes on.

TABLE I
Food Dyes

Food and Drug Administration Official Name	C.I. Constitution Number	Food Dye Name	C.I. Generic Name for other Applications	Limitations	Status
<i>Subject to Certification</i>	<i>C.I.</i>	<i>C.I.</i>	<i>C.I.</i>		
FD&C Yellow No. 5	19140	Food Yellow 4	Acid Yellow 23	Sausage casings under 150 ppm Skins of oranges under 2.0 ppm	Permanent
Orange B	19235	—	Acid Orange 137		Permanent
Citrus Red No. 2	12156	—	Solvent Red 80		Permanent
FD&C Red No. 3	45430	Food Red 14	Acid Red 51		Permanent
FD&C Blue No. 1	42090	Food Blue 2	Acid Blue 9	Maraschino cherries under 150 ppm	Permanent
FD&C Yellow No. 6	15985	Food Yellow 3	—		Provisional
FD&C Red No. 2	16185	Food Red 9	Acid Red 27		Provisional
FD&C Red No. 4	14700	Food Red 1	—		Provisional
FD&C Violet No. 1	42640	Food Violet 2	Acid Violet 49		Provisional
FD&C Blue No. 2	73015	Food Blue 1	Acid Blue 74		Provisional
FD&C Green No. 3	42053	Food Green 3	—		Provisional
<i>Exempt from Certification</i>					
Carbon Black	77266	—	Pigment Black 6 and 7	Channel black only Pet foods under 0.25%	Provisional
Synthetic Iron Oxide	77492	—	Pigment Yellow 42 and 43		Permanent
	77491	—	Pigment Red 101 and 102		
	77499	—	Pigment Brown 6 and 7		
Titanium Dioxide	77891	—	Pigment Black 11	Under 1% Salt for animals under 0.5%	Permanent
Ultramarine Blue	77007	—	Pigment White 6		Permanent
Annatto Extract	75120	—	Pigment Blue 29		Permanent
Beet Powder	—	—	Natural Orange 4	Under 15 milligrams/pound	Permanent
beta-Apo-8'-carotenal	40820	Food Orange 6	—		Permanent
beta-Carotene	75130	Food Orange 5	Natural Yellow 26		Permanent
Canthaxanthin	40850	Food Orange 8	—	Under 30 milligrams/pound	Permanent
Caramel	—	—	Natural Brown 10		Permanent
Carrot Oil	—	—	—		Permanent

TABLE I—continued

Food and Drug Administration Official Name	C.I. Constitution Number	Food Dye Name	C.I. Generic Name for other Applications	Limitations	Status
Cochineal Extract	C.I. 75470	C.I. —	C.I. Natural Red 4	Chicken Feed Chicken Feed Ripe Olives	Permanent
Corn Endosperm Oil	—	—	—		Permanent
Dried Algae Meal	—	—	—		Permanent
Ferrous Gluconate	—	—	—		Permanent
Fruit Juice	—	—	—	Beverages	Permanent
Grape Skin Extract	—	—	—		Permanent
Paprika	—	—	—		Permanent
Paprika Oleoresin	—	—	—		Permanent
Riboflavin	—	—	—	Chicken Feed	Permanent
Saffron	75100	—	Natural Yellow 6		Permanent
Tagetes Meal	75125	—	Natural Yellow 27		Permanent
Toasted Cottonseed Flour	—	—	—		Permanent
Turmeric	75300	—	Natural Yellow 3	Permanent Permanent Permanent	Permanent
Turmeric Oleoresin	—	—	—		Permanent
Vegetable Juice	—	—	—		Permanent

TABLE II
Drug Dyes

Food and Drug Administration Official Name	C.I. Constitution Number	C.I. Generic Name for other Applications	Limitations	Status
<i>Subject to Certification</i>	C.I.	C.I.		
FD&C Yellow No. 5	19140	Acid Yellow 23	Ingested, provisional topical	Permanent
FD&C Red No. 3	45430	Acid Red 51	Ingested, provisional topical	Permanent
D&C Red No. 39	13058	Pigment Red 100	External germicide under 0.1%	Permanent
D&C Green No. 6	61565	Solvent Green 3	Sutures, provisional other	Permanent
[Phthalocyaninato(2-)] copper	74160	Pigment Blue 15	Polypropylene sutures under 0.5%	Permanent
FD&C Blue No. 1	42090	Acid Blue 9	Ingested, provisional topical	Permanent
<i>Exempt from Certification</i>				
Synthetic Iron Oxide	77491 77492 77499	Pigment Red 101 and 102 Pigment Yellow 42 and 43 Pigment Brown 6 and 7 Pigment Black 11 Pigment White 6	Under 5 milligrams/day	Permanent
Titanium Dioxide	77891	Pigment White 23 and 24		Permanent
Alumina (dried aluminum hydroxide)	77002			Permanent
Annatto Extract	75120	Natural Orange 4		Permanent
beta-Carotene	75130	Natural Yellow 26		Permanent
Calcium Carbonate	77220	Pigment White 18		Permanent
Canthaxanthin	40850	Food Orange 6		Permanent
Caramel	—	Natural Brown 10		Permanent
Cochineal Extract; Carmine	75470	Natural Red 4		Permanent
Pyrophyllite	—	—	External	Permanent
Talc	77019	Pigment White 26		Permanent
Carbon Black	77266	Pigment Black 6 + 7	Channel black only	Provisional
Chromium-Cobalt-Aluminum Oxide	—	—	Suture only	Provisional
Fustic	—	Natural Yellow 11		Provisional
Logwood	75290	Natural Black 1		Provisional
Pyrogallol	76515	Oxidation Base 32	Suture only	Provisional

TABLE III
Drug and Cosmetic Dyes

Food and Drug Administration Official Name	C.I. Constitution Number	C.I. Generic Name for other Applications	Limitations	Status
<i>Subject to Certification</i>	C.I.	C.I.		
FD&C Yellow No. 6	15985	Food Yellow 3	External only	Provisional
D&C Yellow No. 7	45350:1	Solvent Yellow 94		Provisional
D&C Yellow No. 8	45350	Acid Yellow 73	External only	Provisional
D&C Yellow No. 10	(Sodium Salt) 47005	Acid Yellow 3 (Food Yellow 13)	External only	Provisional
D&C Yellow No. 11	47000	Solvent Yellow 33		Provisional
Ext. D&C Yellow No. 1	13065	Acid Yellow 36	External only	Provisional
Ext. D&C Yellow No. 7	10316	Acid Yellow 1	External only	Provisional
D&C Orange No. 4	15510	Acid Orange 7	External only	Provisional
D&C Orange No. 5	45370:1	Solvent Red 72	Dentifrices or external only	Provisional
D&C Orange No. 10	45425:1	Solvent Red 73		Provisional
D&C Orange No. 11	45425	Acid Red 95		Provisional
D&C Orange No. 17	(Sodium Salt) 12075	Pigment Orange 5	External only	Provisional
FD&C Red No. 2	16185	Food Red 9, Acid Red 27	Limited internally	Provisional
FD&C Red No. 4	14700	Food Red 1		Provisional
D&C Red No. 6	15850	Pigment Red 57	Lipstick under 6% or external	Provisional
D&C Red No. 7	15850:1	Pigment Red 57:1		Provisional
D&C Red No. 8	(Calcium Salt) 15585	Pigment Red 53	Lipstick under 6% or external	Provisional
D&C Red No. 9	15585:1	Pigment Red 53:1		Provisional
D&C Red No. 10	(Barium Salt) 15630	Pigment Red 49	Lipstick under 6% or external	Provisional
D&C Red No. 11	15630:2	Pigment Red 49:2		Provisional
D&C Red No. 12	(Calcium Salt) 15630:1	Pigment Red 49:1	Lipstick under 6% or external	Provisional
D&C Red No. 13	(Barium Salt) 15630:3	Pigment Red 49:3	Lipstick under 6% or external	Provisional
D&C Red No. 17	(Strontium Salt) 26100	Solvent Red 23		Provisional
D&C Red No. 19	45170	Basic Violet 10	External only	Provisional
D&C Red No. 21	45380:2	Solvent Red 43		Provisional
D&C Red No. 22	45380	Acid Red 87	Lipstick under 6% or external	Provisional
D&C Red No. 27	45410:1	Solvent Red 48		Provisional
D&C Red No. 28	45410	Acid Red 92		Provisional
D&C Red No. 30	(Sodium Salt) 73360	Vat Red 1	External only	Provisional
D&C Red No. 31	15800:1	Pigment Red 64:1		Provisional
D&C Red No. 33	(Calcium Salt) 17200	Acid Red 33	Lipstick under 6% or external	Provisional
D&C Red No. 34	15880:1	Pigment Red 63:1		Provisional
D&C Red No. 36	(Calcium Salt) 12085	Pigment Red 4	Dentifrices or external only	Provisional
D&C Red No. 37	45170:1	Solvent Red 49		Provisional
FD&C Violet No. 1	(Stearate) 42640	Food Violet 2	External only	Provisional
D&C Violet No. 2	60725	Acid Violet 49		Provisional
FD&C Blue No. 2	73015	Solvent Violet 13	External only	Provisional
D&C Blue No. 4	42090	Food Blue 1, Acid Blue 74		Provisional
D&C Blue No. 6	(Ammonium Salt) 73000	Acid Blue 9	Sutures only	Provisional
D&C Blue No. 9	69825	(Similar) Vat Blue 1		Provisional
FD&C Green No. 3	42053	Vat Blue 6	Sutures only	Provisional
D&C Green No. 5	61570	Food Green 3		Provisional
D&C Green No. 8	10020	Acid Green 25	Dentifrices or external only	Provisional
Ext. D&C Green No. 1	(Iron Salt) 59040	Acid Green 9		Provisional
Ext. D&C Green No. 1	59040	Solvent Green 7	External only	Provisional
<i>Exempt from Certification</i> Potassium Sodium Copper Chlorophyllin	75810	Natural Green 3	Dentifrices under 0.1%	Permanent

TABLE IV
Cosmetic Dyes

Food and Drug Administration Official Name	C.I. Constitution Number	C.I. Generic Name for other Applications	Limitations	Status
<i>Subject to Certification</i>	C.I.	C.I.		
FD&C Yellow No. 5	19140	Food Yellow 4		Provisional
FD&C Red No. 3	45430	Acid Yellow 23 Food Red 14 Acid Red 51		Provisional
FD&C Blue No. 1	42090	Food Blue 2 Acid Blue 9		Provisional
D&C Green No. 6	61565	Solvent Green 3		Provisional
<i>Exempt from Certification</i>				
Aluminium Hydroxide	77002	Pigment White 23 and 24		Provisional
Aluminium Powder	77000	Pigment Metal 1		Provisional
Aluminium Silicate	77005	Pigment White 19		Provisional
Aluminium Stearate	—	—		Provisional
Annatto	75120	Natural Orange 4		Provisional
Azulene	—	—		Provisional
Barium Sulfate	77120	Pigment White 21 and 22		Provisional
Bentonite	77004	Pigment White 19		Provisional
Bismuth Oxychloride	77163	Pigment White 14		Provisional
Bronze Powder	77440	Pigment Metal 2		Provisional
Calcium Carbonate	77220	Pigment White 18		Provisional
Calcium Stearate	—	—		Provisional
Calcium Sulfate	—	—		Provisional
Caramel	—	Natural Brown 10		Provisional
Carbon Black	77266	Pigment Black 6 + 7	Channel Black only	Provisional
Carmine	75470	Natural Red 4		Provisional
Carotene	75130	Natural Yellow 26		Provisional
Chlorophyll	75810	Natural Green 3		Provisional
Chromium Hydroxide Green	77289	Pigment Green 18		Provisional
Chromium Oxide Green	77288	Pigment Green 17		Provisional
Copper, Metallic Powder	77400	Pigment Metal 2		Provisional
Copper Versenate	—	—		Provisional
Ferric Ferrocyanide	77510	Pigment Blue 27		Provisional
Gold	77480	Pigment Metal 3		Provisional
Graphite	77265	Pigment Black 10		Provisional
Guanine	75170	Natural White 1		Provisional
Iron Oxides	77491	Pigment Yellow 42 and 43		Provisional
	77492	Pigment Red 101 and 102		Provisional
	77499	Pigment Brown 6 and 7		Provisional
		Pigment Black 11		Provisional
Kaolin	77005	Pigment White 19		Provisional
Lithium Stearate	—	—		Provisional
Magnesium Aluminum Sili- cate	—	—		Provisional
Magnesium Carbonate	—	—		Provisional
Magnesium Oxide	77711	—		Provisional
Magnesium Stearate	—	—		Provisional
Magnesium Trisilicate	77019	Pigment White 26		Provisional
Henna	75480	Natural Orange 6	Hair not near eye	Permanent
Manganese Violet	77742	Pigment Violet 16		Provisional
Mica	77019	Pigment White 20		Provisional
Silicic Acid	—	—		Provisional
Silicon Dioxide	77811	Pigment White 27		Provisional
Silk, Powdered	—	—		Provisional
Talc	77019	Pigment White 26		Provisional
Tin Oxide	77861	Pigment White 15		Provisional
Titanium Dioxide	77891	Pigment White 6		Provisional
Ultramarine Blue	77007	Pigment Blue 29		Provisional
Ultramarine Green	77013	Pigment Green 24		Provisional
Ultramarine Pink	77007	—		Provisional
Ultramarine Red	(note) 77007	—		Provisional
Ultramarine Violet	(note) 77007	Pigment Violet 15		Provisional
Zinc Carbonate	(note) 77950	—		Provisional
Zinc Oxide	77947	Pigment White 4		Provisional
Zinc Stearate	—	—		Provisional

APPENDIX III

Dyes permitted for use in Western Germany

(Bundesgesetzblatt, 1966, Part I)

List A. Food Colours permitted for addition during manufacture and preparation

C.I. Constitution Number	C.I. Food Dye Name	C.I. Generic Names for other Applications
13015	Food Yellow 2	Acid Yellow 9
15985	Food Yellow 3	—
19140	Food Yellow 4	Acid Yellow 23
14270	Food Yellow 8	Acid Orange 6
47005	Food Yellow 13	Acid Yellow 3
15980	Food Orange 2	—
14815	Food Red 2	—
14720	Food Red 3	Acid Red 14
16255	Food Red 7	Acid Red 18
16290	Food Red 8	Acid Red 41
16185	Food Red 9	Acid Red 27
45430	Food Red 14	Acid Red 51
73015	Food Blue 1	Acid Blue 74
69800	Food Blue 4	Vat Blue 74
42051	Food Blue 5	Acid Blue 3
44090	Food Green 4	Acid Green 50
28440	Food Black 1	—
27755	Food Black 2	—

List B. For colouring coatings of cheese and casings of sausages

15850:1 C.I. Pigment Red 57:1

For colouring coatings of cheese all List A.

List C. For stamping the surface of foodstuffs and their packaging material, also for colouring or painting the shells of eggs

All from Lists A and B and

45190	C.I. Acid Violet 9
42535	C.I. Basic Violet 1
74100	C.I. Pigment Blue 16
74260	C.I. Pigment Green 7
10020	C.I. Acid Green 1
44045	C.I. Basic Blue 26
44040	C.I. Basic Blue 11
42735	C.I. Acid Blue 104
42170	C.I. Acid Green 22
12150	C.I. Solvent Red 1
21230	C.I. Solvent Yellow 29
	C.I. Solvent Blue 35

APPENDIX IV

Food Colours for use by E.E.C.

EEC Proposed Directive 1966

C.I. Constitution Number	C.I. Generic Name	Category
13015	Food Yellow 2	2
15985	Food Yellow 3	1
19140	Food Yellow 4	1
14270	Food Yellow 8	2
47005	Food Yellow 13	2
15980	Food Orange 2	2
14815	Food Red 2	2
14720	Food Red 3	2
16255	Food Red 7	1
16290	Food Red 8	2
16185	Food Red 9	1
45430	Food Red 14	1
73015	Food Blue 1	1
69800	Food Blue 4	2
42051	Food Blue 5	1
44090	Food Green 4	1
28440	Food Black 1	2
27755	Food Black 2	2

All are proposed for food use. Dyes in category 1 are proposed for pharmaceutical use; those in category 2 are proposed for pharmaceutical use for 3 years only.

INGRAIN DYES

The term *Ingrain Dye* is correctly applied to all types of dyes which are formed *in situ* in the substrate by the development and coupling of one or more intermediate compounds. The term as such covers, therefore, the well established Azoic Dyes and Oxidation Bases. In the previous edition they were placed as subsections of the Ingrain Dyes but as the usage groups are placed in alphabetical order in the

present edition the Azoic Dyes and Oxidation Bases are no longer integrated in the Ingrain Section which now includes only those Ingrain dyes which fall outside the scope of the Azoic Dye and Oxidation Base sections. These dyes are few and are limited to those which have been developed by workers in the field of phthalocyanine chemistry.

GENERAL LITERATURE ON APPLICATION

Literature on the application of the Ingrain dyes is sparse and consists mostly of that issued by the makers of these dyes, but the following contain some useful information:

Clarke, W., Alcian 'X' Farbstoffe im Textildruck, *Textil-Rundschau*, **11** (1956) 136

Diserens, L., *Progrès réalisé dans l'application des matières colorantes*, Vol. 3 (Paris, 1956) 92

Gund, F., New Developments in Application of Phthalocyanines in Textile Printing, *JSDC*, **69** (1953) 671

C.I. Ingrain Yellow 1

APPLICATION

Dyeing Dissolve with acetic acid, dye or apply by padding from an acid bath, followed by treatment in a fixing bath

Printing Dissolve with lactic acid and a suitable solvent and prepare with a suitable thickening agent. Print, dry, and steam. After steaming, complete fixation by treatment in a solution of sodium dichromate and acetic acid. Rinse, and soap at or near to the boil. May be printed alongside vat, solubilised vat, basic or mordant dyes

FASTNESS ON COTTON ISO

ACID (inorganic) 3
ALKALI 5
CHLORINE 5
HOT PRESSING 5

Not dischargeable

HUE Yellow

LIGHT $\frac{1}{2} \times$ Normal 4
Normal 4
2 \times Normal 4-5
PEROXIDE 3
PERSPIRATION 5
WASHING 5

C.I. Ingrain Yellow 2

This C.I. Generic Name is discontinued, dyes previously listed under it now appear under C.I. Condense Sulphur Yellow 1

APPLICATION

Dyeing Cellulose. Dissolve with acetic acid, dye or apply by padding from an acid bath, followed by treatment in a fixing bath

Printing Cellulose. Dissolve with lactic acid and a solvent and prepare with a thickening agent. Print, dry, and steam. After steaming fixation is completed by a treatment in a solution of sodium dichromate and acetic acid. Rinse, and soap at or near to the boil

FASTNESS ON COTTON ISO

ACID (inorganic)	5
ALKALI	5
CHLORINE	4-5
HOT PRESSING	4

Not dischargeable

Hue Bright Greenish Blue

LIGHT $\frac{1}{2} \times$ Normal	6
Normal	6-7
$1\frac{1}{2} \times$ Normal	6-7
PEROXIDE	3
PERSPIRATION	5
WASHING	5

C.I. 74160 (note 3)

Phthalocyanine

C.I. Ingrain Blue 2

APPLICATION

Dyeing Cellulose and Silk. Dissolve in a special solvent, add an organic copper complex, pad, dry and fix in an aqueous bath containing formic acid or a mixture of formic and oxalic acids

Printing Cellulose and Silk. Dissolve in a special solvent, add an organic copper complex, pad, dry, steam, complete fixation in an aqueous bath containing formic and oxalic acids, rinse and soap at the boil. May be printed alongside azoic and vat dyes

FASTNESS ON COTTON ISO

CHLORINE	4
LIGHT $\frac{1}{2}$ – $\frac{1}{2} \times$ Normal	7
Normal	7-8
$2 \times$ Normal	8
WASHING	5

Hue Bright Blue

C.I. 74160 (note 3)

C.I. Ingrain Blue 2:1

APPLICATION

Dyeing Cellulose and Silk. Dissolve in a special solvent, pad or dye and develop in an acid bath

Printing Cellulose and Silk. Dissolve in a special solvent, add thickening, print, dry, develop by neutral or acid steam or by baking at 130–140°C. Aftertreat with hydrochloric acid, rinse and soap at the boil. Can be printed alongside azoic, vat and reactive dyes and pigments and on grounds of azoic coupling components. Suitable for resist styles

FASTNESS ON COTTON ISO

HOT PRESSING	5
HYPOCHLORITE	3-4
LIGHT $\frac{1}{2} \times$ Normal	7-8
$\frac{1}{2} \times$ Normal	8
Normal	8

Chemical Constitution

1,3-Diaminoisindoline + an organic copper complex

Hue Bright Blue

MERCERISING	5
PEROXIDE BLEACHING	5
SODA BOIL (6)	5

C.I. 74160 (note 3)

C.I. Ingrain Blue 2:2

APPLICATION

Printing Nylon. The material must be prepared in absence of strong alkali, chelating agents, reducing agents and acids. It is then treated in a bath of Phthalogen P by the exhaust method and then padded with the dye dissolved in a mixture of methanol, an emulsifying agent, a special solvent and urea. The padded material is dried, the dyeing fixed by dry heat, treated with hydrochloric acid, rinsed and soaped at the boil

FASTNESS ON NYLON ISO

LIGHT $\frac{1}{2} \times$ Normal	5-6
$\frac{1}{2} \times$ Normal	6
$\frac{1}{2} \times$ Normal	6-7
Normal	7
WATER	5
WASHING (95°C)	5
PERSPIRATION Acid	5
Alkaline	5

Hue Bright Blue

SEA WATER	5
CHLORINATED WATER	5
DRY CLEANING	5
HOT PRESSING	5
THERMOFIXATION (30s 190°C)	
	3-4 deeper
GAS FUME FADING	4-5
DISCHARGEABILITY	Poor

Phthalocyanine

C.I. Ingrain Blue 3

APPLICATION

Dyeing Cellulose. Dissolve with acetic acid, dye or pad from an acid bath and then alkaline fix

Printing Cellulose. Dissolve in water with an acidic and/or solubilising component together with thickening agent. Print and fix by drying, baking or steaming and clearing

FASTNESS ON COTTON ISO

ACID (tartaric)	5
ALKALI (Na ₂ CO ₃)	5
HYPOCHLORITE	4-5R
HOT PRESSING	3-4G

Hue Bright Greenish Blue

LIGHT Normal	6-7
$1\frac{1}{2} \times$ Normal	6-7D
PEROXIDE BLEACHING	4G
PERSPIRATION	5
WASHING (85°C)	5

APPLICATION

Printing Cellulose. As for C.I. Ingrain Blue 3

FASTNESS ON COTTON ISO

ACID (sulphuric)	3-4
ALKALI (Na ₂ CO ₃)	5
HYPOCHLORITE	4-5
HOT PRESSING	4-5

HUE **Bright Blue**
ARTIFICIAL LIGHT: duller

LIGHT $\frac{1}{8} \times$ Normal	6
Normal	6-7
2 \times Normal	6-7
PEROXIDE BLEACHING	3GD
PERSPIRATION	5
WASHING (55°C)	5

C.I. 74161:2

C.I. Ingrain Blue 5

APPLICATION

Printing Cellulose and Silk. Dissolve in an organic acid and thickening and a special auxiliary agent having reducing properties. Print, dry, develop with neutral or acid steam or by baking, treat in a hot acid bath, rinse and soap. Can be printed alongside azoic, reactive and vat dyes and pigments and on grounds of azoic coupling components

FASTNESS ON COTTON ISO

HOT PRESSING	5
HYPOCHLORITE	1
LIGHT $\frac{1}{8} \times$ Normal	8
Normal	8

HUE **Blue**

MERCERISING	5
PEROXIDE BLEACHING	2-3
SODA BOIL (b)	5
WASHING (c)	4-5

This C.I. Generic Name is discontinued, the dyes formerly listed under it now appear under C.I. Ingrain Blue 2:1 and C.I. Ingrain Blue 15:1 respectively

C.I. Ingrain Blue 6

Phthalocyanine (modified)

C.I. Ingrain Blue 7

APPLICATION

Printing Cellulose. Dissolve in a special solvent and add thickening. Print, dry, develop by neutral or acid steam or by baking at 130-140°C, treat in a hot acid bath, rinse and soap at the boil. Can be used alongside azoic, reactive and vat dyes and on grounds of azoic coupling components

FASTNESS ON COTTON ISO

HOT PRESSING	5
HYPOCHLORITE (a)	3-4
LIGHT $\frac{1}{8} \times$ Normal	7
Normal	8
2 \times Normal	8

PEROXIDE BLEACHING	5
SODA BOIL (b)	5
WASHING (c)	5

Chemical Constitution

A mixture of 1,3-diiminosioindoline with 5,7-dihydro-5,7-diimino-2,3-dimethylpyrrolo[3,4,b]-p-dithiin and an organic nickel complex

Phthalocyanine

C.I. Ingrain Blue 8

APPLICATION

Printing Cotton. As for C.I. Ingrain Blue 3

FASTNESS ON COTTON ISO

ACID (sulphuric)	3
ALKALI (Na ₂ CO ₃)	5
HYPOCHLORITE	4-5
HOT PRESSING	4

HUE **Greenish Blue**
ARTIFICIAL LIGHT: duller

LIGHT $\frac{1}{8} \times$ Normal	6
Normal	6-7
2 \times Normal	6-7
PEROXIDE BLEACHING	3 GD
PERSPIRATION	5
WASHING (55°C)	5

C.I. Ingrain Blue 9 and 10

These C.I. Generic Names are discontinued, the dyes formerly listed under them now appear under C.I. Condense Sulphur Blue 1 and 2 respectively

APPLICATION

Printing Cellulose. Alone or alongside vat dyes by the two-phase method or alone by the Rongalite (C.I. Reducing Agent 2) potash method. Colour value on natural cellulose is better than on rayon unless the latter has been swollen with alkali. It is a liquid and is applied in an aqueous paste containing a thickener, alkali and a reducing agent and then steam aged

FASTNESS ON COTTON ISO

DRY CLEANING	.. .. .	4-5
HOT PRESSING	.. .. .	4-5
HYPOCHLORITE	.. .. .	3-4
LIGHT $1\frac{1}{2} \times$ Normal	.. .. .	6
$\frac{1}{3} \times$ Normal	.. .. .	6-7
Normal	.. .. .	6-7

HUE Brilliant Blue

MERCERISING	.. .. .	4-5
PEROXIDE WASHING (95°C)	.. .. .	4
PERSPIRATION	.. .. .	4-5
WASHING (95°C)	.. .. .	4
WATER	.. .. .	5

PROPERTIES

Sensitive to iron and to polyphosphates but not to orthophosphates
Unaffected by alkaline crêping and PVC coating

APPLICATION

Printing Natural Cellulose. Alone or mixed with all types of dyes suitable for printing cotton under alkaline conditions in absence of a reducing agent. Suitable for use with or alongside vat dyes by the two-phase process. Can be used as an illuminating colour alongside and as a fall-on over vat dyes containing reducing agents

FASTNESS ON COTTON ISO

DRY CLEANING	.. .. .	5
HYPOCHLORITE	.. .. .	3-4
LIGHT $\frac{1}{15} \times$ Normal	.. .. .	6
$\frac{1}{3} \times$ Normal	.. .. .	6-7
Normal	.. .. .	7

HUE Brilliant Greenish Blue

(Two-phase Printing Process)		
PEROXIDE WASHING	.. .. .	4
PERSPIRATION	.. .. .	4-5
WASHING	.. .. .	4
WATER	.. .. .	5

Direct printing results in the wet fastness properties being slightly lower

Suitable for overprinting with caustic or for PVC coating

APPLICATION

Dyeing Cellulose. Treat with Phthalofix FN and Glauber's salt at 80°C, cold rinse, then dye and develop with alkaline dithionite (C.I. Reducing Agent 1) at 50-60°C, rinse and scour with hydrochloric acid

Silk. Dye direct, develop with C.I. Reducing Agent 6 and formic acid for 20 min at 80°C, rinse and scour with hydrochloric acid

FASTNESS ISO

	Cotton	Viscose	Silk
ACID	5	5	5
ALKALI	5	5	—
CHLORINE (b)	2-3, GG	3, G	—
CHLORITE BLEACH	3, G	3, G	—
DRY CLEANING	5	—	—
HOT PRESSING	5	5	5
LIGHT $\frac{1}{3} \times$ Normal	—	6-7	6-7
$\frac{1}{3} \times$ Normal	7	7	7
Normal	7	—	—
MERCERISING	4-5	—	—
PEROXIDE BLEACH	4-5	4-5	4-5
PERSPIRATION	5	5	5
SEA WATER	5	5	—
SODA BOIL	4-5	—	—
SODA BOIL-CHLORINE BLEACH	not suitable	—	—
WASHING (203°F)	4-5	4-5	4-5
WATER	5	5	5

HUE Bright Blue

APPLICATION

Dyeing Cellulose. As for C.I. Ingrain Blue 13 but develop with C.I. Reducing Agent 6 and formic acid at 80°C
 Silk. As for C.I. Ingrain Blue 13

FASTNESS ISO

HUE Greenish Blue

	Cotton	Viscose	Silk
ACID	5	5	5
ALKALI	5	5	5
CHLORINE (b)	2, GGG	3, G	—
CHLORITE BLEACH	3-4	3	—
DRY CLEANING	5	—	—
HOT PRESSING	5	5	5
LIGHT $\frac{1}{2} \times$ Normal	—	7	6-7
$\frac{1}{2} \times$ Normal	7	7	7
Normal	7	—	—
MERCERISING	4-5	—	—
PEROXIDE BLEACH	4-5	4-5	4-5
PERSPIRATION	5	5	5
SEA WATER	5	5	—
SODA BOIL	4-5	—	—
SODA BOIL-CHLORINE BLEACH	unsuitable	—	—
WASHING (203°F)	4-5	4-5	4-5
WATER	5	5	5

C.I. 74160:1

Phthalocyanine

C.I. Ingrain Blue 15

APPLICATION

Dyeing Cellulose and Silk. As for C.I. Ingrain Blue 2:1
Printing Cellulose and Silk. As for C.I. Ingrain Blue 2:1

FASTNESS ON COTTON ISO

HUE Greenish Blue

HOT PRESSING	5	MERCERISING	5
HYPOCHLORITE (a)	3-4	PEROXIDE BLEACHING	5
LIGHT $\frac{1}{2} \times$ Normal	7-8	SODA BOIL (b)	5
$\frac{1}{2} \times$ Normal	8		
Normal	8		

C.I. Ingrain Green 1

APPLICATION

Dyeing Dissolve with acetic acid, dye or pad from an acid bath and then treat in a fixing bath

Printing Dissolve with lactic acid, a solvent and a thickening agent. Print, dry, steam, complete fixation by treatment with an aqueous solution of sodium dichromate and acetic acid, rinse and soap at or near the boil. May be printed alongside vat, solubilised vat, basic or mordant dyes

FASTNESS ON COTTON ISO

ACID (inorganic)	4-5
ALKALI	4-5
CHLORINE	5
HOT PRESSING	4-5

Not dischargeable

HUE Bluish Green

LIGHT $\frac{1}{2} \times$ Normal	6
Normal	6-7
2 \times Normal	7
PEROXIDE	3
PERSPIRATION	5
WASHING	5

C.I. Ingrain Green 2

APPLICATION

Dyeing As C.I. Ingrain Green 1

Printing As C.I. Ingrain Green 2

FASTNESS ON COTTON ISO

ACID (inorganic)	4-5
ALKALI	5
CHLORINE	4-5
HOT PRESSING	5

Not dischargeable

HUE Green

LIGHT $\frac{1}{2} \times$ Normal	4-5
Normal	5
2 \times Normal	5-6
PEROXIDE	3-4
PERSPIRATION	5
WASHING	5

C.I. 74280

Phthalocyanine

C.I. Ingrain Green 3

APPLICATION

Dyeing Cotton and linen. Dissolve in a special solvent, add an organic copper complex, pad, dry and cure at 150°C. Aftertreat with hydrochloric acid, rinse and soap at the boil

Printing Cotton, viscose, linen and silk. Dissolve in a special solvent, add an organic copper complex, print, dry, develop by neutral or acid steam, treat with hydrochloric acid, rinse and soap at the boil. Can be printed alongside azoic and reactive dyes and pigments and on grounds of azoic coupling components. Suitable for resist styles

FASTNESS ON COTTON ISO

LIGHT Normal	8
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HUE Bright Bluish Green

C.I. 74280

Phthalocyanine

C.I. Ingrain Green 3:1

APPLICATION

Printing Cellulose. Dissolve in a special solvent adding glacial acetic acid if necessary, neutralise with ammonia and stir into an aqueous solution or emulsion of a thickening agent. After printing dry at the highest possible temperatures and if this does not give satisfactory fixation then subject to neutral or acid steam for 5-10 min or bake for 5-8 min at 130-140°C. Finally clear with sulphuric or hydrochloric acid, rinse and soap at the boil. It may be printed alongside azoic and solubilised vat dyes and pigments

FASTNESS ON CELLULOSE ISO

LIGHT $\frac{1}{2} \times$ Normal	7
$\frac{1}{3} \times$ Normal	7-8
$\frac{1}{3} \times$ Normal	7-8
Normal	8
WATER	5
SEA WATER	5
WASHING (95°C)	5
PEROXIDE WASHING	5
PEROXIDE BLEACHING	4-5

Resistant to resin finishing and PVC coating

HUE Bright Bluish Green

HYPOCHLORITE BLEACHING 2-3,Y	
CHLORITE BLEACHING	2-3
MERCERISING	5
PERSPIRATION Acid	5
Alkaline	5
DRY CLEANING	
White Spirit	5
Perchloroethylene	4
HOT PRESSING	4,B

C.I. Ingrain Green 4

This C.I. Generic Name is discontinued, dyes formerly listed under it now appear under C.I. Condense Sulphur Green 1

APPLICATION

Dyeing Nylon. Prepare the material in absence of strong alkali, chelating agents, reducing agents and acids. Then treat in a bath of Phthalogen P by the exhaust method, pad with the dye, dry, fix by dry heat, treat with hydrochloric acid, rinse and soap at the boil. The dye is dissolved in a mixture of methanol, an emulsifying agent, a special solvent, urea and acetic acid

FASTNESS ON NYLON ISO

LIGHT $\frac{1}{2} \times$ Normal	..	..	5
$\frac{1}{3} \times$ Normal	..	..	5-6
$\frac{1}{4} \times$ Normal	..	..	6-7
Normal	..	..	7
WATER	..	..	5
WASHING (95°C)	..	..	5
PERSPIRATION Acid	..	..	5
Alkaline	..	..	5
SEA WATER	..	..	5

HUE Bluish Green

CHLORINATED WATER	..	4-5
DRY CLEANING .. ..	..	5
HOT PRESSING .. ..	..	5
THERMOFIXATION		
(30s 190°C) ..	3-4 deeper	
GAS FUME FADING .. ..	..	4-5
DISCHARGEABILITY	Poor	

C.I. Ingrain Green 5:1

APPLICATION

Printing Cellulose. Dissolve in a special solvent, adding glacial acetic acid if necessary, neutralise with ammonia and stir into an aqueous solution or emulsion of a thickening agent. After printing, dry at the highest possible temperature; this may suffice for fixation but if not then fixation is accomplished by neutral or acid steaming for 5-10 min or baking for 5-8 min at 130-140°C. Finally treat with sulphuric or hydrochloric acid, rinse and soap at the boil. It may be printed alongside azoic and solubilised vat dyes and pigments

FASTNESS ON CELLULOSE ISO

LIGHT $\frac{1}{2} \times$ Normal	..	..	6-7
$\frac{1}{3} \times$ Normal	..	..	7
$\frac{1}{4} \times$ Normal	..	..	7-8
Normal	..	..	8
WATER	..	..	5
SEA WATER	..	..	5
WASHING (95°C)	..	..	5
PEROXIDE WASHING	..	..	5
PEROXIDE BLEACHING	..	..	5
Resistant to resin finishing and PVC coating			

HUE Bright Bluish Green

HYPOCHLORITE BLEACHING	3, Y
CHLORITE BLEACHING	.. 2
MERCERISING	.. .. 5
PERSPIRATION Acid	.. .. 5
Alkaline	.. 5
DRY CLEANING	
White Spirit	.. .. 5
Perchloroethylene	.. .. 5
HOT PRESSING	.. .. 4, B

APPLICATION

Printing Applied from an aqueous paste containing a thickener and 1% of acetic acid

FASTNESS ON COTTON ISO**HUE Reddish Brown**

WATER (b)	.. .. . 5, 5, 5	CHLORINATED WATER	.. 5
WASHING (c)	.. .. . 5, 5, 5	CHLORINE (a)	.. .. . 1
SEA WATER	.. .. . 5, 5, 5	(b)	.. .. . 1
PERSPIRATION Acid	.. .. . 5, 5, 5	BENZINE	.. .. . 5, 5, 5
Alkaline	.. .. . 5, 5, 5	PERCHLOROETHYLENE	.. .. . 5, 5, 5
SODA BOIL	.. .. . 5, 2-3, 2-3	RUBBING Dry	.. .. . 3-4
PEROXIDE WASHING	.. .. . 5, 5, 5	Wet	.. .. . 4
PEROXIDE BLEACHING	.. .. . 5, 5, 5	LIGHT (Xenon lamp)	.. 7-8

LEATHER DYES

The Acid, Mordant and Direct dyes listed in the following pages are those thought to have an important leather usage.

Many other dyes of these classes and also Basic dyes can be used on leather. Where a leather usage has been suggested by the dyestuff manufacturer reference is made to this in the Acid, Mordant, Basic or Direct dye sections of the Third Edition, under "Non-Textile Usage".

In the case of those dyes for which fastness assessments are available, cross-reference is made in the Acid, Mordant or Direct dye sections of the Third Edition, under Non-Textile Usage, to the Leather Dyes Section, where these fastness figures are recorded.

Fastness

Before 1946, no co-ordinated attempt had been made to establish standard tests for fastness of dyeings on leather, and few fastness figures were published by the dye manufacturers. In that year the Society of Dyers and Colourists, in conjunction with the Society of Leather Trades' Chemists, appointed a committee to study the question and a report was published in 1949 (*JSDC*, **65**, 1949, 325).

This work was continued by the Fastness Tests Committee of the SLTC and further methods for the determination of fastness of coloured leather, were proposed for consideration as official methods. (*JSLTC*, **40**, 1956, 183; *ibid.*, **41**, 1957, 120; *ibid.*, **42**, 1958, 226). The official methods of the Society of Leather Trades' Chemists, for the determination of the

colour fastness of leather were later published as Section 2 (SLF Methods) of the "Official Methods of Analysis" (1965).

At the IXth Congress of the International Union of Leather Chemists Societies held at Lyon in September, 1965, the Council of Delegates provisionally accepted as standard, certain methods of test, as recommended by the International Fastness Tests Commission (I.E.K.L.). These were called IUF Methods (*JSLTC*, **50**, 1966, 286). Wherever possible these methods were so drafted as to conform with the current ISO recommendations for textiles, in order to facilitate their eventual adoption by the International Standards Organisation. At subsequent Congresses in 1967 and 1969 further test methods were proposed as official methods.

The Society of Leather Trades' Chemists has recently adopted certain IUF Methods as Official Methods of the Society and the corresponding SLF Methods have been re-numbered so that their numbers are the same as the IUF numbers.

In the tables below, the fastness assessments according to the SLTC Tests (SLF Methods) are given where these are available. In the absence of this information, the ratings according to other test methods such as VESLIC (Verein Schweizerische Lederindustrie-Chemiker), some of which are also IUF methods, or SDC, are included. Where the test method is not known, the code letters for the dye manufacturer who supplied the information are inserted.

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NOTES

Leather Dyes—C.I. Acid Yellow 1—86

C.I. Acid Yellow	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
1	10316	Nitro											
2	47010	Quinoline											
3	47005	Quinoline											
5	47035	Quinoline											
7	56205	Ketonamine											
9	13015	Monoazo											
11	18820	Monoazo	Green Yellow	SDC	—	5	5	—	—	—	—	—	—
17	18965	Monoazo	Green Yellow	SLTC	—	4	4-5	3-4	—	4	1-2	—	2-3
23	19140	Monoazo	Dull Yellow	SLTC	5	4	4	—	—	—	—	—	—
25	18835	Monoazo											
26	13105	Monoazo											
27	19130	Monoazo	Dull Yellow	SLTC	—	4	3-4	4	—	1	1	—	2-3
29	18900	Monoazo	Green Yellow	SLTC	—	3-4	5-6	3	—	2	3	—	2-3
34	18890	Monoazo											
36	13065	Monoazo											
37	—	Azo											
38	25135	Disazo											
40	18950	Monoazo											
42	22910	Disazo	Dull Yellow	SLTC	3	2	3-4	3	4-5	1	1	3	4
44	23900	Disazo	Green Yellow	SLTC	—	2	2-3	3	—	1-2	2	—	3
54	19010	Met. Azo											
56	24825	Disazo	Yellow	SDC	3	2	4	—	—	—	—	—	—
57	—	—	Yellow	SDC	5	5	5	—	—	—	—	—	—
59	—	Met. Azo	Green Yellow	FH	1	1-2	5	—	—	—	—	—	—
61	—	—	Green Yellow	SLTC	—	2	4-5	3	—	2-3	3-4	—	3
62	—	—	Yell. Orange	Fran	3	1	4-5	—	—	—	5	4	5
63	13095	Monoazo											
65	14170	Monoazo											
67	—	Disazo	Green Yellow	VESLIC	—	1	3	3	3	3	3	4	4
80	—	—	Dull R. Yellow	SLTC	1	3	3-4	4	—	3-4	2-3	—	3
82	—	Disazo											
83	—	—	Brown	SLTC	2	3	3	3	—	3-4	3	—	3-4
85	—	Azo	Green Yellow	SDC	—	2	5	—	—	—	—	—	—
86	23310	—	Yellow	SDC	3	3	4	—	—	—	—	—	—

Leather Dyes—C.I. Acid Yellow 90—189

C.I. Acid Yellow	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
90	—	Disazo											
93	—	Met. Azo	Yellow	SDC	—	2-3	7-8	—	—	—	—	—	—
96	—	—	Yellow	SDC	4	1-2	5-6	—	—	—	—	—	—
98	14006	Met. Azo											
99	13900	Met. Azo	Yellow	SLTC	3	3	3	—	—	—	4	3-4	4
100	14091	Met. Azo	Dull Yellow										
104	—	Met. Azo	Yellow	SLTC	4	2	6	—	—	—	4-5	5	4-5
105	—	Monoazo	Yellow	SDC	—	2	2	—	—	—	—	—	—
106	18670	Met. Azo											
107	—	Met. Azo											
109	—	—	Green Yellow	FH	5	2	3	—	—	—	—	—	—
111	—	—	Yellow										
112	—	—	Red Yellow										
113	—	Met. Azo											
114	—	Met. Azo											
115	—	Disazo											
116	—	—	Dull Yellow	SLTC	—	2	5-6	4	—	3	4-5	—	2-3
117	24820	Disazo											
121	18690	Met. Azo	Yellow	Fran	3	—	3-4	4	—	—	3	5	5
126	—	—	Green Yellow	FW	—	3	3	—	—	—	—	—	—
127	—	Monoazo	Dull Yellow	SLTC	2	1	5	—	—	—	3	4	3-4
128	—	Met. Azo	Dull Yellow	SLTC	2	1	5	—	—	—	4	4-5	4
129	—	Met. Azo	Yellow	VESLIC	—	—	5-6	—	—	—	2	4-5	4-5
131	—	Monoazo	Green Yellow	VESLIC	—	—	5-6	—	—	—	3	4-5	4
132	—	Disazo											
134	11650	Met. Azo											
137	—	Met. Azo											
138	—	Met. Azo											
139	—	Met. Azo											
179	—	Met. Azo		SDC	—	—	5	—	—	—	—	—	—
185	14101	Monoazo	Green Yellow	Fran	5	—	3	4-5	—	—	5	4-5	5
187	—	Disazo	Red. Yellow	Fran	4	—	4	2-3	—	—	4	5	5
188	—	Disazo	Yellow	Fran	5	1-2	4-5	—	—	—	3-4	3	4-5
189	—	Monoazo											

Leather Dyes—C.I. Acid Orange 1—74

C.I. Acid Orange	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
1	13090/13091	Monoazo	Dull Yellow	SLTC	2	3	4	2	2	2	2	2	2
3	10385	Nitro	Yell. Brown	SLTC	2	5	5	4-5	3	1	1	3-4	3
6	14270	Monoazo											
7	15510	Monoazo	Orange	SLTC	5	5	3	2	2	1	1	3	3
8	15575	Monoazo	Bright Orange	SLTC	5	3	2-3	-	-	-	2	2	2
10	16230	Monoazo	Dull Orange	SLTC	-	5	3-4	3	-	1	1	-	2
12	15970	Monoazo	Orange	SDC	-	5	3	-	-	-	-	-	-
19	14690	Monoazo	Red	SLTC	-	3	2	4	-	4	2	-	-
20	14600	Monoazo	Bright Orange	SDC	-	5	1	-	-	-	-	-	-
23	15540	Monoazo											
24	20170	Disazo	Yell. Brown	SLTC	4	2	3	1	2	2	1	2	3
25	20160	Disazo											
26	—	Met. Azo											
28	16240	Monoazo	Orange	SLTC	-	-	2-3	4	-	4	1	-	-
31	15995	Monoazo											
33	24780	Disazo	Orange	SDC	-	2	3	-	-	-	-	-	-
34	—	Met. Azo											
43	—	—											
45	22195	Disazo	Red. Orange	SLTC	-	-	2-3	3-4	-	4-5	4-5	-	-
47	—	—	Orange	VESLIC	-	1	3-4	5	3	2	3	3	3
48	—	Azo	Yell. Orange	SDC	-	3	2	-	-	-	-	-	-
49	23260	Disazo											
50	13150	Monoazo											
51	26550	Disazo	Brown	SLTC	3	2	5	4-5	-	4	4-5	-	3-4
56	22895	Disazo											
61	19320	Met. Azo	Dull Yellow	Fran	3	-	3-4	4	-	-	5	5	5
62	—	Met. Azo	Orange	SLTC	4	2	4-5	-	-	-	3-4	4-5	4-5
64	—	Met. Azo											
65	—	—											
66	—	—	Red. Orange	SDC	3	1	3	-	-	-	-	-	-
69	—	—	Dull Orange	SDC	5	3	4	-	-	-	-	-	-
70	—	—	Orange	SDC	5	3	4	-	-	-	-	-	-
72	18740	Met. Azo											
74	18745	Met. Azo	Orange	SLTC	4	3	5	5	2	2	3	4-5	4-5

Leather Dyes—C.I. Acid Orange 76—133, Red 1—33

C.I. Acid Orange	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
76	18870	Met. Azo	Orange	SLTC	1	2	4-5	-	-	-	2	4-5	3-4
77	—	—	Orange	Fran	3	1-2	2-3	-	-	-	5	3	5
78	—	—	Orange	SDC	2	1-2	5	-	-	-	-	-	-
80	—	—											
81	—	—	Orange	SDC	4	3-4	2	-	-	-	-	-	-
82	—	—											
87	—	—	Yell. Brown	SLTC	-	2	5-6	4	-	3	4	-	3
88	—	—	Red. Orange	SLTC	-	2-3	6	4-5	-	3-4	4	-	3
94	—	Disazo											
95	—	Disazo											
97	13890	Met. Azo											
98	12695	Met. Azo											
99	12696	Met. Azo											
100	11640	Met. Azo											
101	—	—	Red. Orange	SDC	2	5	2	-	-	-	-	-	-
103	—	Met. Azo											
107	—	Met. Azo	Red. Orange	FH	4	1-2	5	-	-	-	-	-	-
112	—	Met. Azo											
133	—	Met. Azo		Roum	-	-	5	-	-	-	-	-	-
Red													
1	18050	Monoazo	Bluish Red	SLTC	-	5	3	3	-	1	1	-	-
4	14710	Monoazo	Bright Red	SDC	-	4-5	3	-	-	-	-	-	-
9	15635	Monoazo											
13	16045	Monoazo											
14	14720	Monoazo		SDC	-	3	2	-	-	-	-	-	-
16	16180	Monoazo	Bordeaux	SLTC	2	3	2	1	1	1	1	4	4
18	16255	Monoazo		SDC	-	4	3	-	-	-	-	-	-
20	14830	Monoazo											
21	14965 (similar)	Monoazo											
26	16150	Monoazo	Scarlet	SDC	-	3-4	2	-	-	-	-	-	-
27	16185	Monoazo											
29	16570	Monoazo											
32	17065	Monoazo											
33	17200	Monoazo											

Leather Dyes—C.I. Acid Red 34—129

C.I. Acid Red	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER								
						Pene- tration	Light	Perspiration			Washing			
								Alt.	Co.	Wo.	Alt.	Co.	Wo.	
34	17030	Monoazo												
35	18065	Monoazo	Bluish Red	SLTC	—	4	2	2-3	—	1	1	—	—	
37	17045	Monoazo	Bluish Red	SLTC	—	4	3-4	4	—	1	1	—	2-3	
39	—	Monoazo												
42	17070	Monoazo												
44	16250	Monoazo	Scarlet	SDC	—	4	2	—	—	—	—	—	—	
50	45220	Xanthene												
52	45100	Xanthene												
57	—	Monoazo	Dull Red	SLTC	—	3	4-5	4	—	3	1	—	2-3	
65	24830	Disazo												
73	27290	Disazo	Red	SLTC	5	4	3-4	4	—	1	1	—	2	
76	18115	Monoazo	Bluish Red											
80	68215	Anthraquinone	Bluish Red	SDC	—	3	4	—	—	—	—	—	—	
82	68205	Anthraquinone												
85	22245	Disazo	Bright Red	SLTC	2	—	3	4	—	4	3-4	—	—	
87	45380	Xanthene												
88	15620	Monoazo	Bluish Red	SDC	—	3	2	—	—	—	—	—	—	
89	23910	Disazo	Bright Red	SLTC	2	—	1-2	3-4	—	2	3-4	—	—	
97	22890	Disazo	Scarlet	SLTC	2	2	2	1	3	1	1	4	4	
99	23285	Disazo	Red	SLTC	4	2	3	2	2	2	2	3	4	
101	50085	Azine												
102	14730	Monoazo	Scarlet	SDC	—	3	2	—	—	—	—	—	—	
103	50090	Azine												
104	26420	Disazo												
106	18110	Monoazo	Red	SDC	—	4-5	—	—	—	—	—	—	—	
111	23266	Disazo												
113	—	Monoazo												
114	23635	Disazo	Bright Red	SLTC	—	—	2-3	4	—	4	4	—	—	
115	27200	Disazo	Red	SDC	—	3	4	—	—	—	—	—	—	
118	—	—	Dull Red	SLTC	—	—	3	3	—	1	2-3	—	—	
119	—	—	Red Brown	SLTC	—	2-3	3-4	4	—	1	—	—	2	
120	—	Monoazo	Bordeaux	VESLIC	—	1	3-4	5	3	3	4	3	3	
128	24125	Disazo	Bordeaux	Fran	5	2	2	3-4	—	—	5	4	4	
129	—	—	Bluish Red	SLTC	—	—	3	—	—	—	3	—	—	

Leather Dyes—C.I. Acid Red 131—209

C.I. Acid Red	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER								
						Pene- tration	Light	Perspiration			Washing			
								Alt.	Co.	Wo.	Alt.	Co.	Wo.	
131	—	Monoazo												
132	—	Disazo												
133	17995	Monoazo												
134	24810	Disazo												
137	17755	Monoazo												
140	—	—	Scarlet	SDC	—	1-2	2	—	—	—	—	—	—	—
141	15625	Monoazo	Red	VESLIC	—	2	1	4	1	1	3	1-2	1-2	
145	—	—	Yellowish Red	SLTC	—	2	3-4	2-3	—	1-2	3	—	2	
150	27190	Disazo												
151	26900	Disazo												
154	24800	Disazo	Bluish Red	FBy	5	1	3	—	—	—	—	—	—	—
167	—	Disazo	Bordeaux	SLTC	—	—	2-3	—	—	—	3	—	—	
175	—	Monoazo												
178	—	Met. Azo												
179	19351	Met. Azo	Red	Fran	5	—	4-5	4	—	—	4-5	5	5	
180	18736	Met. Azo	Red	SDC	—	2	4	—	—	—	—	—	—	
182	—	Met. Azo												
183	18800	Met. Azo	Orange	SLTC	3	2	3-4	—	—	—	2-3	4	4	
184	15685	Met. Azo												
186	18810	Met. Azo	Pink	SLTC	5	2	4	—	—	—	3	3	4-5	
187	16265	Met. Azo												
188	—	Met. Azo												
190	—	Met. Azo												
191	—	Met. Azo												
192	—	—												
193	—	—	Bordeaux	SDC	3	1	1-2	—	—	—	—	—	—	
194	—	Met. Azo	Bordeaux	VESLIC	—	1	4	5	2	2	4	3	3	
195	—	Met. Azo	Pink	SLTC	4	2	4	—	—	—	4	3-4	3-4	
196	—	—	Red	SLTC	3	2-3	2	4	—	1	3-4	—	2	
197	—	Met. Azo												
198	19115	Met. Azo	Yellowish Red	SLTC	5	3	4-5	—	—	—	3	4	3	
199	—	—	Bluish Red	FH	5	2-3	2-3	—	—	—	—	—	—	
202	—	—	Bordeaux	Fran	2	2	1-2	2-3	—	—	3	2	5	
209	—	—	Scarlet	SLTC	4	1	4	—	—	—	3-4	4-5	3-4	

Leather Dyes—C.I. Acid Red 211—299

C.I. Acid Red	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
211	—	—	Red	SLTC	5	1	4	—	—	—	3-4	4	3-4
212	—	Met. Azo	Red	SLTC	5	2	3-4	—	—	—	3	4	4
213	—	—	Bordeaux	SLTC	—	2	5-6	4	—	3-4	4	2-3	3
214	19355	Met. Azo	Bluish Red	SLTC	4	2	3	2	1	1	2	2	3
215	—	—											
216	—	—											
217	—	—											
223	—	Met. Azo	Red	SDC	—	2-3	7-8	—	—	—	—	—	—
229	—	—	Red	SDC	3	1	1-2	—	—	—	—	—	—
231	17040	—	Bluish Red	SDC	5	4	6	—	—	—	—	—	—
234	—	—	Bordeaux	SDC	4	1-2	2-3	—	—	—	—	—	—
235	—	—	Bordeaux	SDC	4	1-2	3-4	—	—	—	—	—	—
237	—	—	Bordeaux	SDC	4	2	3-4	—	—	—	—	—	—
241	—	Disazo	Bluish Red	SDC	4	2	1	—	—	—	—	—	—
248	—	—	Bluish Red	SDC	—	3	4	—	—	—	—	—	—
251	—	Met. Azo	Bordeaux	SLTC	1	1	3-4	—	—	—	4	3	3
253	—	Monoazo	Scarlet	SLTC	2	1	3-4	—	—	—	2-3	3	3
254	—	Azo											
257	—	Monoazo	Pink	VESLIC	—	2	5	—	—	—	—	—	—
258	—	Met. Azo	Bordeaux	VESLIC	—	—	5-6	—	—	—	—	—	—
259	—	Met. Azo	Red	VESLIC	—	—	5	—	—	—	—	—	—
260	—	Disazo	Red	VESLIC	—	—	4	—	—	—	—	—	—
261	—	Azo											
262	—	Met. Azo											
263	—	Monoazo											
268	—	Met. Azo											
269	—	Met. Azo											
277	—	Met. Azo	Bordeaux	FH	2	1-2	5	—	—	—	—	—	—
279	—	Met. Azo											
282	—	Azo	Red	SDC	—	2-3	3-4	—	—	—	—	—	—
283	—	Azo	Yellowish Red	SDC	—	2	2	—	—	—	—	—	—
287	—	Met. Azo	Bluish Red	SDC	—	2-3	4-5	—	—	—	—	—	—
298	—	Met. Azo											
299	—	Disazo											

Leather Dyes—C.I. Acid Red 310—346, Violet 1—67

C.I. Acid Red	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
310	—	Azo	Dull Red	BASF	5	1-2	4	-	-	-	-	-	-
324	—	Monoazo	Red	Roum	4	-	4	-	-	-	-	-	-
325	—	Monoazo											
326	—	Monoazo	Bordeaux	Roum	4	-	3	-	-	-	-	-	-
344	—	Monoazo	Red	Roum	5	-	3-4	-	-	-	-	-	-
346	—	Met. Azo	Bordeaux	Roum	-	-	7	-	-	-	-	-	-
Violet													
1	17025	Monoazo	Dull Violet	SLTC	-	5	3	4	-	1-2	1	-	3
3	16580	Monoazo											
4	—	—											
5	18125	Monoazo											
6	16600	Monoazo											
7	18055	Monoazo	Reddish Violet	SLTC	-	4	3	3	-	1	1	-	-
9	45190	Xanthene	Reddish Violet	SLTC	5	4	3-4	4	-	2	2-3	-	3
11	17060	Monoazo											
12	18075	Monoazo											
14	17080	Monoazo											
15	43525	TPM											
17	42650	TPM	Reddish Blue	VESLIC	-	1	1	4	2	2	1	2	3-4
19	42685	TPM											
21	42580	TPM											
23	42680	TPM											
24	44055	TPM											
25	42745	TPM											
30	45186	Xanthene											
34	61710/61800	Anthraquinone	Dull Violet	SLTC	-	2	3-4	3-4	-	3	2	-	3-4
43	60730	Anthraquinone											
48	—	—	Br. B. Violet	SLTC	-	-	3	-	-	-	3	-	-
49	42640	TPM											
56	16055	Met. Azo	Dull Violet	SLTC	4	2	5	-	-	-	3	3	3-4
58	16260	Met. Azo	Reddish Violet	VESLIC	-	1	4	5	2	2	4	3-4	4
60	—	Met. Azo	Dull Violet	SDC	-	2	5	-	-	-	-	-	-
66	—	—	Dull Violet										
67	18005	Monoazo											

Leather Dyes—C.I. Acid Violet 68—115, Blue 1—29

C.I. Acid Violet	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
68	—	—	Violet	SLTC	2	1	5	—	—	—	4	4	4-5
70	—	—	Violet	SLTC	3	1	5	—	—	—	4	3	2-3
71	—	—	Bluish Red	SLTC	1	1	5	—	—	—	3	3-4	3
76	—	Anthraquinone											
79	—	Met. Azo											
80	—	—	Violet	SDC	4	1-2	4	—	—	—	—	—	—
86	—	—	Violet	SDC	—	5	—	—	—	—	—	—	—
89	—	Met. Azo											
90	18762	Met. Azo											
91	15681	Met. Azo											
92	15708	Met. Azo											
94	—	Met. Azo											
100	—	Met. Azo											
114	—	Met. Azo	Violet	Roum	—	—	6-7	—	—	—	—	—	—
115	—	Met. Azo											
Blue													
1	42045	TPM	Bright Blue	SDC	—	5	2	—	—	—	—	—	—
3	42051	TPM											
5	42052	TPM											
7	42080	TPM											
9	42090	TPM											
10	—	Monoazo											
13	42571	TPM	Bright Blue	SLTC	4	5	2	—	—	—	1-2	3	3-4
15	42645	TPM	Bright Blue	SDC	—	2	1-2	—	—	—	—	—	—
16	—	—											
18	50230	Azine											
19	45205	TPM											
20	50405	Azine	Navy	SDC	—	2-3	4-5	—	—	—	—	—	—
22	42755	TPM	Bright Blue	SLTC	5	2	3	1	3	2	1	4-5	4-5
23	61125	Anthraquinone											
25	62055	Anthraquinone	Blue	SLTC	—	4	3-4	4	—	2	1-2	—	2
26	—	TPM											
27	61530	Anthraquinone											
29	20460	Disazo											

Leather Dyes—C.I. Acid Blue 34—109

C.I. Acid Blue	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
34	42561	TPM											
35	61560	Anthraquinone											
39	29115	Met. Azo	Blue	SDC	2	1	5	—	—	—	—	—	—
40	62125	Anthraquinone	Greenish Blue	SLTC	—	3	4	3	—	2-3	2	—	2
41	62130	Anthraquinone											
43	63000	Anthraquinone											
45	63010	Anthraquinone	Blue	SLTC	—	4	4-5	4	—	4-5	3	—	3-4
47	62085	Anthraquinone	Dull Blue	SLTC	—	4	3-4	4	—	3	1	—	2
51	62145	Anthraquinone											
52	—	Anthraquinone											
55	—	Anthraquinone											
59	50315	Azine	Reddish Blue	SDC	—	2	3	—	—	—	—	—	—
60	—	Polyazo	Dull Blue	SLTC	4	2	2-3	—	—	—	2-3	2-3	3-4
61	50330	Azine											
67	—	—	Blue	SDC	—	2	3	—	—	—	—	—	—
69	63610	Anthraquinone											
72	—	—	Greenish Blue	SLTC	—	4	4	4	—	4-5	2	—	4
73	—	Disazo											
74	73015	Indigoid											
75	42576	TPM											
78	62105	Anthraquinone	Greenish Blue	SLTC	—	4	4	4	—	4-5	2	—	4
82	—	—	Navy	SLTC	—	2-3	3-4	3	—	1	1	—	1
83	42660	TPM	Bright Blue	SLTC	2	1	3	—	—	—	3	3	4
86	44075	TPM											
89	13405	Monoazo											
90	42655	TPM	Bright Blue	SLTC	4	2	3	—	—	—	3-4	3-4	4
92	13390	Monoazo	Blue	SDC	—	2	3	—	—	—	—	—	—
93	42780	TPM											
97	44095	TPM											
98	50355	Azine											
99	—	TPM											
102	50320	Azine	Blue	SDC	—	1	4	—	—	—	—	—	—
104	42735	TPM											
109	42740	TPM											

Leather Dyes—C.I. Acid Blue 113—199

C.I. Acid Blue	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
113	26360	Disazo	Navy	SLTC	5	1	5	2	1	1	1	3	4
115	—	—	Navy	SDC	3	1	2	—	—	—	—	—	—
116	26380	Disazo	Navy										
117	17055	Monoazo	Navy										
118	26410	Disazo											
120	26400	Disazo	Navy	SDC	—	3	2	—	—	—	—	—	—
123	44510	—	Reddish Blue	FH	3	2	3-4	—	—	—	—	—	—
127	61135	Anthraquinone											
129	—	Anthraquinone	Blue	SLTC	—	4	3-4	3-4	—	3-4	2	—	2
133	—	—	Blue	SDC	3	2	5-6	—	—	—	—	—	—
134	—	—	Navy	SDC	3	1	2	—	—	—	—	—	—
142	—	—	Blue	SDC	—	2	3	—	—	—	—	—	—
154	—	Met. Azo	Reddish Blue	SLTC	4	3	4	—	—	—	3	4	4-5
156	—	Met. Azo	Reddish Blue	SLTC	5	2	5	—	—	—	2-3	4-5	3-4
158	14880/15050	Met. Azo	Greenish Blue	SLTC	4	3	3-4	—	—	—	4	3-4	4
161	15706	Met. Azo											
162	—	—	Navy	SDC	2	1-2	1	—	—	—	—	—	—
168	—	—	Navy	SLTC	5	1	4	—	—	—	4-5	4-5	4-5
169	15025	Met. Azo											
170	—	—	Navy	SLTC	3	1	5	—	—	—	4	4-5	4
171	—	—	Navy	SLTC	2	1	5	—	—	—	3-4	4-5	3-4
172	—	—	Navy	SLTC	2	1	4-5	2	1	1	2	2	3
174	18058	Monoazo	Blue										
178	—	—											
181	—	Anthraquinone											
183	—	Monoazo	Bright Blue	SLTC	2	1	4	—	—	—	3-4	3	2-3
184	—	Met. Azo	Navy	VESLIC	—	1	4	5	2-3	2-3	3	4	3
186	—	Met. Azo											
187	—	Met. Azo	Navy	VESLIC	—	—	4-5	—	—	—	5	5	4-5
188	—	Met. Azo	Navy	VESLIC	—	—	5-6	—	—	—	4	4-5	4
193	15707	Met. Azo	Navy										
194	17941	Met. Azo	Navy										
195	—	—	Blue	SDC	4	5	2	—	—	—	—	—	—
199	—	Met. Azo	Blue	FH	1	1-2	5	—	—	—	—	—	—

Leather Dyes—C.I. Acid Blue 201—278, Green 1—50

C.I. Acid Blue	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
201	—	Met. Azo	Navy	FH	5	1-2	5	—	—	—	—	—	—
212	—	Met. Formazan											
216	—	Met. Azo											
227	—	Anthraquinone											
237	—	Trisazo	Dark Blue	Roum	4	—	5	—	—	—	—	—	—
254	—	Phthalocyanine	Greenish Blue	BASF	3	1	5	—	—	—	—	—	—
262	—	Disazo	Blue	Roum	3	—	5	—	—	—	—	—	—
265	—	Met. Complex	Reddish Blue	Roum	—	—	5	—	—	—	—	—	—
278	—	TPM	Bright Blue	Fran	5	1-2	1	4-5	—	—	3	4	4
Green													
1	10020	Nitroso	Green	SDC	—	2	6	—	—	—	—	—	—
3	42085	TPM	Bright Green	SLTC	5	3	1	1	3	2	2	4-5	4-5
5	42095	TPM	Green	SDC	—	3	3	—	—	—	—	—	—
7	42055	TPM											
9	42100	TPM	Bright Green	SLTC	3	2-3	1-2	—	—	—	—	—	—
11	42038	TPM											
12	13425	Met. Azo	Bluish Green	VESLIC	—	1	4	5	2	2	4	2	2
15	42105	TPM											
16	44025	—	Bright Green	SLTC	5	5	2	—	—	—	2	3	2-3
19	20440	—	Dull Green	SLTC	—	2-3	3-4	3	—	1	2	—	3
20	20495	Disazo	Dark Green	SLTC	5	4	4	2	1	1	1	3	4
22	42170	TPM											
24	—	Met. Azo	Yell. Green	SLTC	5	3	3	—	—	—	3	4	4
25	61570	Anthraquinone	Green	SLTC	—	3	4	3-4	—	1	2	—	2
26	—	—	Green	SDC	4	1	7	—	—	—	—	—	—
28	—	—	Yell. Green	SLTC	—	2-3	3-4	3-4	—	3-4	4	—	4
35	13361	Met. Azo	Dark Green	SLTC	3	1	5	—	—	—	3	3-4	3-4
40	—	Anthraquinone											
43	—	—	Dark Green	VESLIC	—	1	4-5	5	3	3	3	4	4
45	13420	Met. Azo											
47	—	—	Dark Green	Fran	5	1-2	2	3	—	—	5	5	5
48	—	Polyazo	Bluish Green	SDC	4	3-4	3	—	—	—	—	—	—
49	—	Met. Azo	Dark Green	SDC	3	1	5	—	—	—	—	—	—
50	44090	TPM											

Leather Dyes—C.I. Acid Green 53—97, Brown 1—40

C.I. Acid Green	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
53	—	—	Green	SDC	—	—	4-5	—	—	—	—	—	—
57	—	Met. Azo	Bright Green	VESLIC	—	—	5	—	—	—	3-4	4-5	3-4
59	—	Anthraquinone	Bright Green	VESLIC	—	—	4	—	—	—	2-3	4	4
60	—	Met. Azo											
62	11836	Met. Azo											
63	—	Met. Formazan											
64	—	Met. Formazan											
67	—	Azo	Dull Green	FH	5	2-3	3	—	—	—	—	—	—
68	—	Azo											
70	—	—	Bluish Green	SLTC	3	2	4	—	—	—	2	4-5	4-5
71	—	Anthraquinone											
73	—	Monoazo	Olive	VESLIC	—	1	4	5	3-4	3	4	4	4
74	—	—	Green	VESLIC	—	1	4-5	5	2-3	2-3	3	3	3
80	—	Met. Azo											
93	—	Met. Azo	Olive	S	—	1-2	3-4	4	3	3	2-3	3	4
97	—	Phthalocyanine	Bright Green	Fran	5	1-2	3-4	5	—	—	4-5	5	5
Brown													
1	10395	Nitro											
3	14610	Monoazo											
6	14625	Monoazo	Red. Brown	SLTC	4	3	2	—	—	—	1-2	3	3
7	—	Monoazo	Brown	VESLIC	—	5	3	5	1	1	3	4	4-5
8	13000	Monoazo											
10	—	—	Brown	SLTC	—	3	5	3	—	4	2	—	4
14	20195	Disazo	Yell. Brown	SLTC	2	2	2	1	2	2	1	3	4-5
19	—	—	Brown	SLTC	2	2	5-6	4	—	4	2	4-5	4
21	—	—	Brown	SLTC	3	1	5	—	—	—	4-5	4	4-5
24	—	Disazo		SDC	2	2-3	2-3	—	—	—	—	—	—
28	—	—											
29	12197	Met. Azo											
30	—	—											
37	—	—	Yell. Brown	SLTC	5	3	3	1	1	1	1	3-4	3-4
38	—	Monoazo	Red. Brown										
39	—	—											
40	—	Trisazo	Brown	SLTC	4	3	4	—	—	—	—	—	—

Leather Dyes—C.I. Acid Brown 41—83

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
41	—	Disazo											
42	14251	Met. Azo											
43	20300	Disazo											
51	—	Monoazo	Brown	SDC	2	5	1-2	-	-	-	-	-	-
52	—	—	Brown	VESLIC	-	1	3-4	5	3	3	4	3	4-5
53	—	Azo	Brown	SLTC	4	1	2-3	-	-	-	4	2-3	4-5
54	—	Trisazo	Red. Brown	SDC	4	1	3	-	-	-	-	-	-
55	—	Disazo	Red. Brown	SDC	4	1	3	-	-	-	-	-	-
56	—	Nitro	Dull Y. Brown	SDC	5	-	5	-	-	-	-	-	-
57	—	Polyazo	Red. Brown	SDC	1	1	3	-	-	-	-	-	-
58	—	—	Brown	VESLIC	-	1	3-4	4	1	2	5	3	4
59	—	Azo	Brown	SDC	4	2	3	-	-	-	-	-	-
60	—	—	Brown	SDC	4	1	-	-	-	-	-	-	-
61	—	—	Yell. Brown	SLTC	4	2	4	-	-	-	4	3	4-5
62	—	Disazo	Red. Brown	SDC	5	1-2	3	-	-	-	-	-	-
63	—	Disazo	Red. Brown	SDC	4	2	2	-	-	-	-	-	-
64	—	Trisazo	Dark Brown	SDC	4	1	3	-	-	-	-	-	-
65	—	Disazo	Red. Orange	SDC	3	2	2	-	-	-	-	-	-
66	—	Trisazo	Red. Brown	SDC	3	1-2	4	-	-	-	-	-	-
67	—	—	Brown	VESLIC	-	1	3-4	4	1	1	3-4	3	3
68	—	—	Red. Brown	SDC	4	3-4	-	-	-	-	-	-	-
69	—	Polyazo	Red. Brown	SDC	3	1	4	-	-	-	-	-	-
70	—	Disazo	Brown	SDC	3	2	4	-	-	-	-	-	-
71	—	Monoazo	Brown	SDC	4	2	3	-	-	-	-	-	-
72	—	Trisazo	Brown	SDC	4	2	2	-	-	-	-	-	-
73	—	Disazo	Brown	SLTC	1	3	4	3	-	1	2-3	-	1-2
74	—	Disazo	Yell. Brown	SLTC	4	2-3	2-3	-	-	-	2	-	3
75	34905	—	Red. Brown	SLTC	4	2	4	3-4	-	1	3	-	2-3
76	—	Trisazo	Dull Brown	SDC	4	2-3	4	-	-	-	-	-	-
77	—	Disazo	Yell. Brown	SLTC	2	2	2-3	-	-	-	-	-	-
78	—	Trisazo	Dark Brown	SLTC	3	2	4-5	2	1	1	2	1	3
79	—	Disazo	Red. Brown	SDC	3	2	2-3	-	-	-	-	-	-
80	—	Disazo	Brown	SLTC	3	2-3	2-3	-	-	-	-	-	-
83	20250	—	Yell. Brown	VESLIC	-	1	3-4	5	1	2	3	2-3	4-5

Leather Dyes—C.I. Acid Brown 84—117

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
84	20255	—	Red. Brown	SDC	5	1	5	—	—	—	—	—	—
85	34900	—	Dark Brown	SDC	4	1	4	—	—	—	—	—	—
86	17620	—	Dark Brown	SDC	4	3	—	—	—	—	—	—	—
87	17596	—	Red. Brown	SDC	4	3	—	—	—	—	—	—	—
88	17595	—	Red. Brown	SDC	5	3	—	—	—	—	—	—	—
89	17570	—	Dull Brown	SDC	5	5	—	—	—	—	—	—	—
90	17100	—	Red. Brown	SDC	5	5	—	—	—	—	—	—	—
91	17550	—	Dull Brown	SDC	5	5	—	—	—	—	—	—	—
92	36020	—	Dark Brown	SDC	4	1	—	—	—	—	—	—	—
93	—	—	Dull Brown	SDC	3	—	1-2	—	—	—	—	—	—
94	—	—	Dull Brown										
95	—	—	Dull R. Brown										
96	—	Met. Azo	Dull Brown	SDC	2	2	3-4	—	—	—	—	—	—
97	—	Met. Azo	Red. Brown	SDC	2	3	3-4	—	—	—	—	—	—
98	—	—	Yell. Brown	VESLIC	—	1	3-4	5	3	3	3	3-4	4
99	—	—	Red. Brown										
100	—	—	Red. Brown	FH	4	2-3	3	—	—	—	—	—	—
101	—	—	Red. Brown	FH	3	2-3	3	—	—	—	—	—	—
102	14615	—	Yell. Brown	FH	4	2-3	2	—	—	—	—	—	—
103	10415	—	Yell. Brown	FH	5	2-3	3	—	—	—	—	—	—
104	—	—	Orange Brown	FH	5	2-3	2	—	—	—	—	—	—
105	33530	—	Red. Brown	SDC	4	4	5	—	—	—	—	—	—
106	—	—	Yell. Brown	FH	4	2-3	2-3	—	—	—	—	—	—
107	—	—	Dark Brown	Fran	4	—	2	4	—	—	4	4	5
108	—	Trisazo	Yell. Brown	Fran	5	1-2	2-3	3	—	—	4	4	4
109	—	—	Orange Brown	Fran	2	1-2	2-3	—	—	—	4-5	2	5
110	—	Polyazo	Violet Brown	Fran	5	1-2	3	—	—	—	4-5	3-4	5
111	—	—	Dull Bordeaux	SDC	3	1	4	—	—	—	—	—	—
112	—	Trisazo	Brown	Fran	4	1	3	3	—	—	4	4	5
113	—	Polyazo	Dark Brown	Fran	3	1	3	3	—	—	4	4	5
114	—	—	Dark Brown	Fran	5	1-2	3-4	3-4	—	—	4	3-4	4-5
115	—	Trisazo	Dark Brown	Fran	3	1-2	2	3-4	—	—	4	4	5
116	—	Polyazo	Dark Brown	Fran	3	1	3-4	4	—	—	4	4	4
117	—	—	Bordeaux	Fran	5	2	2	—	—	—	5	1	4

Leather Dyes—C.I. Acid Brown 118—155

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
118	—	—	Red. Brown	SDC	3	1	1	—	—	—	—	—	—
119	35025	—	Brown	SDC	3	3-4	5	—	—	—	—	—	—
120	35020	—	Red. Brown	SDC	3	4	5	—	—	—	—	—	—
121	33520	—	Yell. Brown	SDC	3	3	5	—	—	—	—	—	—
122	33525	—	Red. Brown	SDC	3	3	5	—	—	—	—	—	—
123	35030	—	Yell. Brown	SDC	3	4	5	—	—	—	—	—	—
125	—	Disazo	Red. Brown	SDC	4	—	2	—	—	—	—	—	—
126	—	—	Dark Brown	SDC	4	4	6-7	—	—	—	—	—	—
127	—	Polyazo	Brown	SDC	4	4	3-4	—	—	—	—	—	—
131	—	—	Red. Brown	SDC	3	5	—	—	—	—	—	—	—
132	—	—	Red. Brown	Fran	5	3-4	3-4	—	—	—	4	4	4-5
133	—	—	Brown	SDC	5	3	3-4	—	—	—	—	—	—
134	—	—	Brown	SDC	3-4	3	3	—	—	—	—	—	—
135	—	—	Brown	SDC	5	3-4	3-4	—	—	—	—	—	—
136	—	—	Dull Brown	SDC	4	4	2-3	—	—	—	—	—	—
137	—	—	Brown	SDC	5	3	3	—	—	—	—	—	—
138	—	—	Yell. Brown	SDC	5	3-4	2-3	—	—	—	—	—	—
139	—	—	Violet Brown	SDC	4	3-4	4	—	—	—	—	—	—
140	—	—	Violet Brown	SDC	4	3	3	—	—	—	—	—	—
141	—	—	Dull Brown	SDC	4	3-4	5	—	—	—	—	—	—
142	—	—	Violet Brown	SDC	4	4	4	—	—	—	—	—	—
143	20260	—	Red. Brown	SDC	4	1	5-6	—	—	—	—	—	—
144	14295	—	Yell. Brown	SLTC	2	1-2	3-4	—	—	—	4	4	4
145	13280	—	Brown	SDC	3	1	6	—	—	—	—	—	—
146	26531	—	Bordeaux	SDC	3	1	6	—	—	—	—	—	—
147	—	—	Dark Brown	VESLIC	—	1	4	4	2	2	4	2	4
148	—	—	Dull Brown	SDC	4	1	5	—	—	—	—	—	—
149	—	—	Brown	SDC	4	1	5	—	—	—	—	—	—
150	—	—	Dark Brown	VESLIC	—	1	4	5	3-4	3-4	3	4	4-5
151	—	—	Red. Brown	VESLIC	—	1	5	4	2-3	3	4	2-3	4-5
152	—	Disazo	Red. Brown	SDC	5	—	5	—	—	—	—	—	—
153	—	Disazo	Yell. Brown	SDC	5	—	5	—	—	—	—	—	—
154	—	Disazo	Yell. Brown	SDC	5	—	5	—	—	—	—	—	—
155	—	Disazo	Brown	SDC	5	—	5	—	—	—	—	—	—

Leather Dyes—C.I. Acid Brown 156—189

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
156	—	Disazo	Brown	SDC	4	1-2	4-5	-	-	-	-	-	-
157	—	Disazo	Brown	SDC	5	4	2-3	-	-	-	-	-	-
158	—	Disazo	Orange Brown	SDC	5	-	5	-	-	-	-	-	-
159	—	—	Brown	SDC	3	1	4	-	-	-	-	-	-
160	—	—	Brown	SDC	4	1-2	7	-	-	-	-	-	-
161	—	—	Brown	SDC	3	2	6	-	-	-	-	-	-
162	—	—	Brown	SDC	4	1-2	7	-	-	-	-	-	-
163	—	—	Brown	SDC	3	1	5	-	-	-	-	-	-
164	—	—	Red. Brown	SDC	3	1	6	-	-	-	-	-	-
165	—	—	Brown	SDC	3	1-2	6	-	-	-	-	-	-
166	—	—	Red. Brown	SDC	5	2	2	-	-	-	-	-	-
167	—	—	Dark Brown	SLTC	2	2	4	1	2	2	3-4	3	4
168	—	—	Dark Brown	SLTC	3	2	3-4	4	1	1	1	1	3
169	—	—	Brown	SDC	2	4	2	-	-	-	-	-	-
170	—	—	Brown	SDC	2	4	2	-	-	-	-	-	-
171	—	—	Brown	SDC	2	3	2	-	-	-	-	-	-
172	—	—	Dark Brown	SLTC	4	2	3	3	1	1	1	2	3
173	—	—	Brown	SDC	4	5	2	-	-	-	-	-	-
174	—	—	Dark Brown	SLTC	4	1	4	1	2	2	4	4	4
175	—	—	Yell. Brown	SLTC	5	3	3	1	1	1	1	3	4
176	—	—	Red. Brown	SLTC	3	1	4	2	1	3	4	3-4	4
177	—	—	Brown	SLTC	5	1	3-4	1	2	3	2	3-4	4
178	—	—	Brown	SLTC	5	2	3	2	1	1	4	3-4	4
179	—	Trisazo	Dull Brown	SDC	3	2-3	3-4	-	-	-	-	-	-
180	—	—	Brown	SDC	2	2	3	-	-	-	-	-	-
181	—	—	Brown	SDC	2-3	2	3	-	-	-	-	-	-
182	—	—	Brown	SDC	2	2	3	-	-	-	-	-	-
183	—	—	Brown	SDC	2	2-3	3-4	-	-	-	-	-	-
184	—	Trisazo	Red. Brown	SDC	2-3	2	2-3	-	-	-	-	-	-
185	—	Trisazo	Red. Brown	SDC	3	2	2-3	-	-	-	-	-	-
186	—	—	Red. Brown	SDC	2	2-3	2-3	-	-	-	-	-	-
187	—	—	Violet Brown	SDC	4	2	-	-	-	-	-	-	-
188	-	—	Yell. Brown	VESLIC	-	2	2-3	-	-	-	3	5	5
189	—	—	Red. Brown	VESLIC	-	2	2-3	-	-	-	3-4	3-4	5

Leather Dyes—C.I. Acid Brown 190—229

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
190	—	—	Red. Brown	SDC	4	2	—	—	—	—	—	—	—
191	—	—	Dark Brown	VESLIC	—	1	4	3-4	1	2	3	2-3	3
193	—	—	Red. Brown	SDC	4	2	4-5	—	—	—	—	—	—
194	—	—	Violet Brown	VESLIC	—	1-2	5	—	—	—	5	3	4-5
195	—	—	Yell. Brown	VESLIC	—	1-2	3-4	—	—	—	5	4-5	5
196	—	—	Red. Brown	VESLIC	—	2	5	—	—	—	5	3-4	5
197	—	Disazo	Brown	SDC	3	2	4	—	—	—	—	—	—
198	—	Disazo	Dull Brown	SDC	2	2	5	—	—	—	—	—	—
199	—	Disazo	Dull R. Brown	SDC	4	1	4	—	—	—	—	—	—
200	—	Disazo	Brown	SDC	2	2	4	—	—	—	—	—	—
201	—	Polyazo	Dull R. Brown	SDC	3	2	5-6	—	—	—	—	—	—
202	—	Disazo	Red. Brown	SDC	4	1	5-6	—	—	—	—	—	—
203	—	Monoazo	Brown	SDC	3	1	3-4	—	—	—	—	—	—
204	—	Disazo	Dull Brown	SDC	4	2	4	—	—	—	—	—	—
205	—	Disazo	Dull Brown	SDC	2	2	5	—	—	—	—	—	—
206	—	Disazo	Brown	SDC	3	2	3-4	—	—	—	—	—	—
207	—	Trisazo	Dull R. Brown	SDC	4	2	5-6	—	—	—	—	—	—
208	—	Disazo	Dull Brown	SDC	3	2	6	—	—	—	—	—	—
209	—	Disazo	Brown	SDC	3	2	3-4	—	—	—	—	—	—
210	—	—	Dark Brown	SDC	3-4	1	5	—	—	—	—	—	—
211	10425	—	Yell. Brown	SDC	5	5	4	—	—	—	—	—	—
212	10380	—	Dull R. Brown	SDC	5	5	3-4	—	—	—	—	—	—
213	20175	Disazo	Brown	Pol	4	—	4-5	—	—	—	—	—	—
214	34907	Trisazo	Brown	Pol	4	—	4-5	—	—	—	—	—	—
215	—	Disazo	Yell. Brown	SLTC	4	2	1	1	2	1	2	3	3
216	34906	Met. Azo	Red. Brown	Fran	5	1-2	3	4-5	—	—	4	4	5
219	—	—	Yell. Brown	FW	—	—	5	—	—	—	—	—	—
220	—	—	Brown	FW	—	—	5	—	—	—	—	—	—
221	—	—	Brown	FW	—	5	2	—	—	—	—	—	—
222	—	—	Brown	FW	—	—	2-3	—	—	—	—	—	—
226	—	Met. Azo	Dull Red	SLTC	3	2-3	5	4	—	3-4	3-4	—	4
227	—	Met. Azo	Brown	VESLIC	—	—	4-5	—	—	—	2	4-5	4-5
228	—	Met. Azo	Brown	SLTC	3	1	5-6	—	—	—	3-4	3-4	4
229	—	Disazo	Red. Brown	Vond	—	3	3	—	—	—	—	—	—

Leather Dyes—C.I. Acid Brown 233—279

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
233	20018	Met. Azo	Red. Brown										
234	11837	Met. Azo	Dull Brown										
235	—	Polyazo	Yell. Brown	VESLIC	—	1	3-4	4	1	2	5	3	3-4
236	—	Azo	Brown	SDC	—	2	3-4	—	—	—	—	—	—
237	—	Azo	Brown	SDC	—	2	4	—	—	—	—	—	—
238	—	Stilbene	Yell. Brown	VESLIC	—	1	3	5	1	3	5	2-3	5
239	—	Trisazo	Dark Brown	VESLIC	—	1	4	4	2	2	4	3	4-5
240	—	Met. Azo	Brown										
241	—	Met. Azo	Brown										
244	—	Polyazo	Brown	CFM	—	—	4	—	—	—	—	—	—
246	—	Met. Azo	Red. Brown	FW	—	—	4	—	—	—	—	—	—
251	—	Met. Azo	Brown	FH	5	1-2	5	—	—	—	—	—	—
253	—	Met. Azo	Red. Brown										
254	—	Met. Azo											
255	—	Met. Azo											
256	—	Met. Azo											
257	—	Met. Azo											
259	—	Met. Azo	Dark Brown	Vond	—	1	4	—	—	—	—	—	—
260	—	Azo	Orange Brown	Vond	—	3	2	—	—	—	—	—	
261	—	Met. Azo	Black. Brown	Vond	—	1	4-5	—	—	—	—	—	—
262	—	Met. Azo	Red. Brown	Vond	—	1	4	—	—	—	—	—	—
264	—	Azo	Brown	BASF	—	1-2	2-3	—	—	—	—	—	—
265	13260	—	Brown	BASF	—	—	4	—	—	—	—	—	—
266	—	Azo	Brown	FH	3	2	4	—	—	—	—	—	—
267	—	Azo	Red. Brown	FH	5	2-3	3-4	—	—	—	—	—	—
268	—	Azo	Dark Brown	FH	5	2-3	4	—	—	—	—	—	—
269	—	Nitro	Brown										
270	—	Met. Azo	Brown	FH	5	2-3	5	—	—	—	—	—	—
271	—	Met. Azo	Bordeaux	FH	—	—	5	—	—	—	—	—	—
272	—	Azo	Brown	FH	—	2-3	2	—	—	—	—	—	—
273	—	Azo	Brown										
276	—	Polyazo	Yell. Brown	S	—	3	4	4	—	2-3	4	—	3
278	—	Polyazo	Yell. Brown	S	—	3-4	4	4-5	—	2	—	—	—
279	—	Polvazo	Brown										

Leather Dyes—C.I. Acid Brown 280—339

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
280	—	Polyazo	Olive Brown	SLTC	4	1-2	3	—	—	—	3	2	4
282	—	Met. Complex	Dark Brown	SLTC	5	2	3-4	—	—	—	1-2	4	3
283	—	Met. Complex	Red. Brown	SLTC	5	2-3	4	—	—	—	2	3	3
288	—	—	Brown	LBH	—	—	4	—	—	—	—	—	—
289	—	—	Brown										
290	—	Azo	Yell. Brown	BASF	4	1-2	4	—	—	—	—	—	—
291	—	Azo	Red. Brown	BASF	5	1-2	4	—	—	—	—	—	—
298	—	—	Brown										
303	—	Met. Azo	Brown	S	—	2	6	5	3	3	2	4	4
304	—	Met. Azo	Yell. Brown										
305	—	Trisazo	Yell. Brown	Roum	5	—	3	—	—	—	—	—	—
306	—	Trisazo	Red. Brown	Roum	2	—	3	—	—	—	—	—	—
307	—	Trisazo	Red. Brown	Roum	2	—	3	—	—	—	—	—	—
308	—	Tetrakisazo	Brown	Roum	2	—	2	—	—	—	—	—	—
309	—	Tetrakisazo	Dark Brown	Roum	2	—	2	—	—	—	—	—	—
310	—	Trisazo	Dark Brown	Roum	2	—	4	—	—	—	—	—	—
311	—	Met. Azo	Yell. Brown	S	—	1-2	5	4	4	3	4	4	3
313	—	Azo	Brown										
314	—	Azo	Yell. Brown	VESLIC	—	2	3	—	—	—	4	4-5	5
318	—	Disazo	Dark Brown	Roum	3-4	—	2-3	—	—	—	—	—	—
319	—	Disazo	Dark Brown	Roum	4	—	4-5	—	—	—	—	—	—
320	—	Polyazo	Dark Brown	SLTC	3	1	3-4	2-3	2	2	2-3	4-5	4-5
321	—	Polyazo	Brown	BASF	5	1-2	4	—	—	—	—	—	—
322	—	Polyazo	Olive Brown	BASF	5	1-2	4	—	—	—	—	—	—
324	—	Monoazo	Yell. Brown	FBy	5	1	4	—	—	—	—	—	—
325	—	Polyazo	Red. Brown	FBy	5	1	1	—	—	—	—	—	—
326	—	Disazo	Yell. Brown	FBy	5	2	2	—	—	—	—	—	—
327	—	Disazo	Red. Brown	FBy	5	2	2	—	—	—	—	—	—
332	—	Met. Azo	Brown	SDC	4	2	2-3	—	—	—	—	—	—
334	—	Tetrakisazo	Brown	Roum	5	—	3	—	—	—	—	—	—
336	—	Met. Azo	Dark Brown	Roum	—	—	7	—	—	—	—	—	—
337	—	Met. Azo	Dark Brown	Roum	—	—	6	—	—	—	—	—	—
338	—	Polyazo	Brown	FH	4	2-3	3	—	—	—	—	—	—
339	—	Azo	Red. Brown	SLTC	3	—	4	2	2	2	2	4	4

Leather Dyes—C.I. Acid Brown 340—351, Black 1—52

C.I. Acid Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
340	—	Monoazo	Olive Brown	VESLIC	—	1-2	4	—	—	—	2	4	5
341	—	Disazo	Red. Brown	Fran	5	1	2-3	3	—	—	4	4	5
342	—	Trisazo	Brown	Fran	5	—	4	3	—	—	4-5	5	5
343	—	Trisazo	Red. Brown	Fran	5	—	2-3	4	—	—	4	3	5
344	—	Met. Azo	Brown	Fran	5	1	4	4	—	—	3	3	5
345	—	Monoazo	Olive Brown	Fran	3	—	3-4	3-4	—	—	5	5	5
347	—	Polyazo	Brown	FH	5	2-3	2	—	—	—	—	—	—
350	—	—	Yell. Brown	SDC	4	2-3	3-4	—	—	—	—	—	—
351	—	—	Green. Brown	SDC	4	2	3-4	—	—	—	—	—	—
Black													
1	20470	Disazo	Bluish Black	SLTC	2	3	4	2	1	1	1	3	4
2	50420	Azine	Bluish Black	SLTC	5	1	6	2	1	2	3	4-5	4-5
7	26300	Disazo											
12	—	Disazo											
14	—	Disazo											
15	—	Disazo											
16	20345	Disazo											
18	27790	Disazo											
21	26405	Disazo	Bluish Black	SLTC	—	—	3	3-4	—	2-3	4	—	—
24	26370	Disazo	Bluish Black	SLTC	—	—	2	—	—	—	3	—	—
26	27070/ 27075/26690	Disazo	Bluish Black	SDC	—	2	3	—	—	—	—	—	—
29	—	—	Black										
31	17580	Monoazo											
32	26990	Disazo											
34	15715	Monoazo											
35	26320	Disazo											
41	20480	Disazo	Bluish Black	SDC	—	3	3	—	—	—	—	—	—
42	—	—	Bluish Black	SDC	4	1	4	—	—	—	—	—	—
43	15691	Met. Azo	Black	SLTC	5	2	5	—	—	—	2	4	4
47	56055	Aminoketone	Bluish Grey	FH	5	2	4-5	—	—	—	—	—	—
48	65005	Anthraquinone	Bluish Grey	SDC	—	1	5	—	—	—	—	—	—
50	—	Anthraquinone	Grey	VESLIC	—	2	3	5	3	1	3	3-4	3
51	16711	Met. Azo	Bluish Grey	SLTC	5	3	5	—	—	—	3-4	4	4-5
52	15711	Met. Azo	Black	SLTC	4	1	5	—	—	—	3	4	4-5

Leather Dyes—C.I. Acid Black 53—103

C.I. Acid Black	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
53	—	Met. Azo	Bluish Grey										
54	14885	Monoazo	Green. Black	SLTC	4	2	4	—	—	—	4	3-4	4-5
58	—	—	Bluish Grey	VESLIC	—	—	6	—	—	—	2-3	5	5
60	—	—	Bluish Grey	SLTC	3	1	5	4	—	4-5	2	4	4
62	—	—	Grey	SLTC	4	1	5	—	—	—	3	4-5	4
65	—	Met. Azo	Grey	Fran	3	2	3	5	—	—	5	5	5
66	30275	—	Black	SDC	4	4	5	—	—	—	—	—	—
67	—	—	Black	SLTC	4	1	4	1	1	2	2	3	4
68	—	—	Black	SDC	4	1	3	—	—	—	—	—	—
69	30260	—	Black	SDC	—	1	—	—	—	—	—	—	—
70	30355	—	Green. Black	SDC	2	1	—	—	—	—	—	—	—
71	—	Met. Azo	Green. Grey	W	—	1-2	6	—	—	—	—	—	—
73	—	Polyazo	Green. Black	SDC	3	1-2	3	—	—	—	—	—	—
75	—	Trisazo	Black	SDC	3	2	4	—	—	—	—	—	—
76	—	Polyazo	Brown. Grey	SDC	4	3	5	—	—	—	—	—	—
77	—	—	Black	SDC	2	2	3-4	—	—	—	—	—	—
78	—	—	Bluish Black	SDC	5	3-4	5	—	—	—	—	—	—
79	—	—	Bluish Black	SDC	5	3-4	2	—	—	—	—	—	—
82	20265	Met. Azo	Black	SDC	2	1	6	—	—	—	—	—	—
83	—	—	Bluish Grey	SDC	2	1-2	6	—	—	—	—	—	—
84	17560	Met. Azo	Grey	SDC	4	3	6	—	—	—	—	—	—
85	—	Azo	Green. Black	SDC	3	1	3	—	—	—	—	—	—
86	—	Polyazo	Bluish Black	SDC	4	1-2	4	—	—	—	—	—	—
87	—	Trisazo	Reddish Black	SDC	3	1	3-4	—	—	—	—	—	—
88	—	Polyazo	Reddish Black	SDC	4	1	3	—	—	—	—	—	—
89	—	—	Black	VESLIC	—	1	1-2	5	1	1	4	2	4
90	—	Trisazo	Bluish Black	SDC	2	2	5-6	—	—	—	—	—	—
92	—	Met. Azo	Bluish Grey	SDC	2	3	3-4	—	—	—	—	—	—
93	35075	—	Black	SDC	—	1	—	—	—	—	—	—	—
94	30336	Polyazo	Bluish Black	VESLIC	—	1	3	5	2	3	4	2	5
95	—	Polyazo	Green. Black	SDC	4	2	3	—	—	—	—	—	—
96	—	Polyazo	Green. Black	SDC	3	1	3	—	—	—	—	—	—
102	—	Met. Complex	Black										
103	—	—	Grey										

Leather Dyes—C.I. Acid Black 104—182

C.I. Acid Black	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
104	—	Met. Azo	Black	SLTC	4	1	5	4	3-4	3	4	5	4-5
107	—	Met. Azo	Bluish Black	SLTC	2	2	5-6	4-5	—	4	4-5	—	4-5
108	—	Met. Azo	Black	SLTC	3	1	5	—	—	—	2	4-5	4
109	—	Azo	Yell. Black										
113	—	Azo	Black										
114	—	Met. Azo	Bluish Grey										
115	—	Met. Azo	Bluish Grey										
124	15900	Met. Azo											
126	—	Trisazo	Black	VESLIC	—	1	3	5	1	3	3-4	2	3-4
127	—	—	Grey	VESLIC	—	1	2	5	2-3	4	4-5	4	5
129	—	Met. Azo											
130	—	Met. Formazan											
131	—	Met. Azo	Black	VESLIC	—	—	5	—	—	—	4-5	4-5	4
132	—	Met. Azo	Black	VESLIC	—	—	5	—	—	—	4-5	5	4
134	—	Met. Azo	Grey	Vond	—	1	4-5	—	—	—	—	—	—
138	—	Met. Azo	Black										
140	—	Met. Azo	Grey	FH	5	1-2	5	—	—	—	—	—	—
143	—	Azo	Bluish Black	Vond	—	1	2-3	—	—	—	—	—	—
144	—	Azo	Green. Black	Vond	—	1	3	—	—	—	—	—	—
145	—	Azo	Black	Vond	—	3	2-3	—	—	—	—	—	—
149	—	Met. Azo	Grey	FH	2	1-2	5	—	—	—	—	—	—
160	—	Trisazo	Black	Roum	4	—	4	—	—	—	—	—	—
161	—	Trisazo	Black	Roum	4	—	5	—	—	—	—	—	—
162	—	Napthoquin- oneimine	Grey	VESLIC	—	2	4-5	—	—	—	2	2	3
163	—	Azo	Grey	VESLIC	—	2	3	—	—	—	4	3	3-4
166	—	Disazo	Black	FH	5	2-3	4	—	—	—	—	—	—
168	—	Met. Azo	Grey										
169	—	Trisazo	Black	VESLIC	—	1-2	4	—	—	—	3	1	5
170	—	Met. Azo	Grey										
173	—	Monoazo	Grey										
182	—	Trisazo	Black	VESLIC	—	1-2	3-4	—	—	—	2	1-2	4

NOTES

Leather Dyes—C.I. Direct Yellow 6—102, Orange 1—23

C.I. Direct Yellow	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
6	40001/40006	Stilbene		SDC	—	2-3	5	—	—	—	—	—	—
11	40000	Stilbene	Yellow	SLTC	2	1	4	—	—	—	1-2	4	4-5
12	24895	Disazo	Dull R. Yellow	SLTC	—	2	4	2-3	—	2	1	—	2-3
26	25300	Disazo	Dull Yellow	SLTC	—	3	3-4	4	—	3-4	3	—	3-4
28	19555	Thiazole		VESLIC	4	2	6	—	—	—	—	—	—
29	19556	Thiazole	Yellow	SLTC	3	1	6	—	—	—	—	—	—
38	—	—	Dull Orange	SLTC	—	2	4	4	—	3	3	—	4
39	—	Stilbene		VESLIC	—	—	4-5	—	—	—	—	—	—
40	—	—											
44	29000	Disazo	Dull Yellow	SLTC	—	2	3-4	4-5	—	4	4	—	4
46	—	Disazo		SDC	—	1	6	—	—	—	—	—	—
47	—	—		VESLIC	—	—	5	—	—	—	—	—	—
49	29035	Disazo	Dull Yellow	SLTC	—	2	3-4	4-5	—	4	4	—	4
50	29025	Disazo	Yellow	SLTC	—	2	4	3-4	—	2	4	—	3-4
54	—	Thiazole- Stilbene		VESLIC	—	—	6	—	—	—	—	—	—
57	—	—	Red. Yellow	SDC	—	1	7	—	—	—	—	—	—
59	49000	Thiazole											
82	—	—	Dull Yellow	SDC	—	1	3-4	—	—	—	—	—	—
93	—	Azo											
94	—	Azo											
95	—	Disazo											
96	—	—		VESLIC	—	—	1	—	—	—	—	—	—
98	—	Azo		VESLIC	—	—	5	—	—	—	—	—	—
99	—	Disazo (Stilb.)											
102	—	Azo											
Orange													
1	22375/22430	Disazo	Orange	SLTC	4	1	5	2	2	3-4	4	3	4-5
6	23365/23375	Disazo		SDC	—	1	2	—	—	—	—	—	—
10	23370	Disazo											
11	—	Trisazo											
15	40002/40003	Stilbene	Orange	SDC	—	2	3-4	—	—	—	—	—	—
17	19160	Monoazo	Orange	FH	5	2	3	—	—	—	—	—	—
18	20215-6/20230	Azo-Thiazole	Red. Orange	SLTC	3	2	2	4	1	3	2	4	4-5
23	—	—		SDC	—	2	4	—	—	—	—	—	—

Leather Dyes—C.I. Direct Orange 26—106, Red 1—79

C.I. Direct Orange	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
26	29150	Disazo	Red. Orange	SLTC	2	2	3	—	—	—	—	—	—
29	29155	Disazo	Orange	VESLIC	—	1	2	5	1	2	4	2	5
34	40215/40220	Stilbene	Yell. Orange	SLTC	3	2	5	—	—	—	—	—	
37	40265	Stilbene		SDC	—	1-2	4-5	—	—	—	—	—	—
39	40215	Stilbene											
40	40265	Stilbene	Brown	SLTC	—	2-3	—	4	—	2	2	—	4-5
51	—	Disazo	Dull R. Orange	SLTC	—	2	4	4	—	3	4	—	4
52	—	—											
61	40210	Stilbene	Yell. Orange	VESLIC	—	1	4	4	1	2-3	3	2	4-5
62	—	Stilbene	Dull R. Orange	SLTC	—	2	3-4	4	—	3	2-3	—	3-4
66	—	Azo		VESLIC	—	—	5-6	—	—	—	—	—	—
72	—	Disazo											
76	—	Monoazo											
91	—	Disazo											
106	—	Polyazo		VESLIC	—	—	5-6	—	—	—	—	—	
Red													
1	22310	Disazo	Bluish Red	SLTC	—	4	4	3	—	2	4	—	4
4	29165	Disazo		SDC	—	2	3	—	—	—	—	—	—
12	—	—		FW	—	—	5	—	—	—	—	—	—
16	27680	Disazo		SDC	—	2	2	—	—	—	—	—	—
23	29160	Disazo	Scarlet	SLTC	2	1	3	—	—	—	2	1-2	4
24	29185	Disazo		SDC	—	1	3	—	—	—	—	—	—
26	29190	Disazo	Dull Red	SLTC	—	—	2	—	—	—	—	—	—
37	22240	Disazo	Red	SLTC	—	—	2-3	—	—	—	3	—	3-4
38	—	—	Bordeaux	SDC	—	4	2-3	—	—	—	—	—	—
39	23630	Disazo	Bluish Red	VESLIC	—	1	2	3	1	2	2-3	1	3
42	22180	Disazo		SDC	—	3	3	—	—	—	—	—	—
43	22205	Disazo											
44	22500	Disazo		SDC	—	2	1	—	—	—	—	—	—
45	14780	Azo-Thiazole		SDC	—	2	3	—	—	—	—	—	—
62	29175	Disazo		SDC	—	1	—	—	—	—	—	—	—
75	25380	Disazo		VESLIC	—	—	4	—	—	—	—	—	—
76	40270	Stilbene	Red	SLTC	—	2-3	4	4	—	2-3	3	—	4
79	29065	Disazo	Bluish Red	SLTC	—	2-3	4	4	—	4	3-4	—	4

Leather Dyes—C.I. Direct Red 80—223, Violet 1—66

C.I. Direct Red	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
80	35780	Polyazo	Bt. Bluish Red	SLTC	—	2	3-4	3	—	3	2	—	3-4
81	28160	Disazo	Bluish Red	SLTC	3	2	3-4	2	1	1	1	3	4
83	29225	Disazo	Bordeaux	SLTC	—	2	4-5	4	—	3	3-4	—	4
84	35760	Polyazo	Red. Brown	SLTC	—	2	4	4	—	3	4	—	3
88	22360	Disazo		VESLIC	—	—	3	—	—	—	—	—	4
91	—	—		VESLIC	—	—	4	—	—	—	—	—	—
92	—	—		VESLIC	—	—	6-7	—	—	—	—	—	—
94	—	Polyazo											
95	—	—											
99	29167	Met. Azo	Bordeaux	VESLIC	—	1	4	5	1	3	3	2-3	5
100	—	Disazo	Bordeaux	SLTC	2	1-2	4	4	—	2	1-2	2	4-5
111	40290	Stilbene	Red. Brown	SLTC	—	2	—	4	—	2	4	—	3-4
114	—	Disazo		VESLIC	—	—	4-5	—	—	—	—	—	—
115	—	—	Red. Brown	SLTC	—	2	3	4	—	2	3	—	4
116	—	Disazo	Brown	SLTC	—	2	3-4	4	—	1	4-5	—	2
143	—	—											
149	29110	Disazo											
196	—	Polyazo	Br. Yell. Red	SDC	—	—	3	—	—	—	—	—	—
220	—	—											
223	—	Azo											
Violet													
1	22570	Disazo	Violet	SLTC	3	2	4-5	—	—	—	—	—	—
7	27855	Disazo		SDC	—	1-2	3-4	—	—	—	—	—	—
9	27885	Disazo											
15	—	Azo	Reddish Violet	SLTC	3-4	1-2	3	—	—	—	1-2	—	—
22	22480	Disazo		SDC	—	1	1-2	—	—	—	—	—	—
46	17515	Met. Azo											
47	25410	Disazo		VESLIC	—	—	6-7	—	—	—	—	—	—
48	29125	Met. Azo											
51	27905	Disazo	Violet	VESLIC	—	1	2	3	1	2	2	1	3-4
60	—	Met. Azo											
66	29120	Disazo	Dull Violet	SLTC	—	3	4	3	—	2-3	2	—	3

Leather Dyes—C.I. Direct Blue 1—250

C.I. Direct Blue	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
1	24410	Disazo	Dull Blue	SLTC	—	2	1-2	—	—	—	3	—	—
2	22590	Disazo	Navy	SLTC	3	1	4	2	1	1	2	3	4
6	22610	Disazo	Reddish Blue	SLTC	3	1	1	—	—	—	3	—	—
14	23850	Disazo	Blue	VESLIC	—	1	1	3	1	2	2	1	5
15	24400	Disazo		SDC	—	1	3	—	—	—	—	—	—
20	—	Disazo	Reddish Blue	VESLIC	4	2	3	—	—	—	—	—	—
21	23710	Disazo											
22	24280	Disazo		SDC	—	1	2	—	—	—	—	—	—
25	23790	Disazo	Blue	SDC	—	1-2	—	—	—	—	—	—	—
30	31955	Trisazo		SDC	—	1	2	—	—	—	—	—	—
59	—	—		SDC	3	1	4-5	—	—	—	—	—	—
63	31910	Trisazo	Navy	SDC	—	1	2	—	—	—	—	—	—
64	22595	Disazo											
67	27925	Disazo		VESLIC	—	—	5	—	—	—	—	—	—
69	34210	Trisazo		VESLIC	—	—	5	—	—	—	—	—	—
71	34140	Trisazo		SDC	—	1-2	5	—	—	—	—	—	—
74	—	Trisazo	Reddish Blue	VESLIC	4	3	5	—	—	—	—	—	—
76	24411	Met. Azo	Green. Blue	SLTC	—	2	4	4-5	—	4-5	4	—	4-5
77	—	—	Dull Blue	SLTC	—	2	4	4	—	3-4	3	—	4-5
78	34200	Trisazo	Blue	VESLIC	—	1	3-4	3	1	3	2	3	5
79	—	Disazo											
80	—	Met. Azo	Dull R. Blue	SLTC	—	2	5	4	—	4	4	—	4
86	74180	Phthalocyanine	Br. Green. Blue	VESLIC	—	—	6	—	—	—	—	—	—
92	—	—		VESLIC	—	—	5	—	—	—	—	—	—
98	23155	Disazo		VESLIC	—	—	6	—	—	—	—	—	—
106	51300	Oxazine	Br. Red. Blue	VESLIC	—	—	5-6	—	—	—	—	—	—
109	51310	Oxazine		SDC	—	1	7	—	—	—	—	—	—
126	34010	Trisazo											
158	24555	Disazo											
160	—	—		SLTC	—	—	3-4	—	—	—	4	—	—
173	—	—		SLTC	—	—	3	—	—	—	2	—	—
189	—	Phthalocyanine	Br. Blue. Green	SLTC	—	2	5-6	4	—	4	3	—	4-5
212	—	Met. Azo		VESLIC	—	—	6-7	—	—	—	—	—	—
250	—	Met. Azo											

Leather Dyes—C.I. Direct Blue 251, Green 1—70, Brown 1—58

C.I. Direct Blue	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
251	—	Trisazo											
Green													
1	30280	Trisazo	Dark Green	SLTC	2	1	3	—	—	—	2-3	1-2	4-5
6	30295	Trisazo	Green	SLTC	3	2	3	—	—	—	—	—	—
8	30315	Trisazo		SDC	—	1	3	—	—	—	—	—	—
24	—	Monoazo											
26	34045	Trisazo	Dark Green	VESLIC	—	1	4	5	1	3	4-5	3	4-5
27	—	Polyazo	Dull Bl. Green	SLTC	—	2	4	4	—	4-5	4	—	4-5
28	14155	Anthraquinone	Br. Yell. Green	SLTC	—	3	3-4	3-4	—	2-3	3	—	—
29	—	—		VESLIC	—	—	5	—	—	—	—	—	—
37	—	Trisazo		VESLIC	—	—	5	—	—	—	—	—	—
59	34040	Trisazo											
66	—	Stilb. (Trisazo)	Green	VESLIC	—	1	4	5	1	4-5	4	3-4	4-5
69	—	Met. Azo		VESLIC	—	—	5-6	—	—	—	—	—	—
70	—	Azo											
Brown													
1	30045/30110	Trisazo		SDC	—	1	3-4	—	—	—	—	—	—
2	22311	Disazo	Red. Brown	SLTC	2	2	4-5	2	1	2	3	3	4
4	—	Azo		SDC	—	2-3	2-3	—	—	—	—	—	—
6	30140	Trisazo		SDC	—	1	6	—	—	—	—	—	—
9	—	—		SDC	—	1	—	—	—	—	—	—	—
25	36030	Trisazo	Yell. Brown	SLTC	2	1	3	4-5	2	2	4	4	4-5
26	31730	Trisazo		SDC	—	2	4	—	—	—	—	—	—
27	31725	Trisazo		SDC	—	2	3	—	—	—	—	—	—
29	40505	Stilbene	Dark Brown	VESLIC	3	2	2	—	—	—	—	—	—
30	17630	Monoazo											
31	35660	Polyazo	Brown	SLTC	5	1	3	3	2	2	3	4-5	4-5
32	34015	Trisazo											
33	35520	Polyazo		SLTC	3	1	3	—	—	—	—	—	—
34	40510	Stilbene		VESLIC	—	—	2	—	—	—	—	—	—
44	35005/35010	Polyazo		SDC	—	2	4	—	—	—	—	—	—
54	31735	Trisazo											
55	—	Monoazo		SDC	—	1	3-4	—	—	—	—	—	—
58	22340	Disazo	Dull R. Brown	SLTC	—	—	2-3	—	—	—	3	—	—

Leather Dyes—C.I. Direct Brown 59—217, Black 4,5

C.I. Direct Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
59	22345	Disazo											
75	30325	Trisazo		SDC	-	1	3-4	-	-	-	-	-	-
80	20210	Disazo	Red. Brown	FBy	5	1	1	-	-	-	-	-	-
88	—	—	Brown	SDC	-	1	2	-	-	-	-	-	-
89	—	—	Dull R. Brown	FH	-	1	-	-	-	-	-	-	-
90	—	—	Yell. Brown	FH	-	1	-	-	-	-	-	-	-
91	—	—	Brown	FH	-	1	-	-	-	-	-	-	-
92	—	—	Yell. Brown	SDC	-	1	-	-	-	-	-	-	-
93	31860	Trisazo	Red. Brown	SDC	-	3-4	5	-	-	-	-	-	-
94	—	—	Red. Brown	SDC	-	1	-	-	-	-	-	-	-
95	30145	Trisazo	Dark Brown	SLTC	3-4	2	6	4	-	4	4	-	4
97	—	—		VESLIC	-	-	5	-	-	-	-	-	-
98	—	—		VESLIC	-	-	5-6	-	-	-	-	-	-
99	34020	Trisazo	Red. Brown	SLTC	3	1	5	-	-	-	-	-	-
101	31740	Trisazo		SDC	-	2-3	2	-	-	-	-	-	-
103	—	—		VESLIC	-	-	6	-	-	-	-	-	-
105	—	Trisazo											
106	36200	Polyazo											
107	—	Stilbene	Yell. Brown	VESLIC	-	1	3-4	3	1	3-4	3	2	5
112	29166	Disazo	Red. Brown	SLTC	-	2-3	4-5	4	-	2	3-4	-	3
115	—	—		VESLIC	-	-	4	-	-	-	-	-	-
116	—	—		VESLIC	-	-	6	-	-	-	-	-	-
132	31505	Trisazo											
140	—	—		SDC	-	1	-	-	-	-	-	-	-
192	—	—	Red. Brown	FW	-	1	3	-	-	-	-	-	-
193	—	—	Red. Brown	FW	-	1	2	-	-	-	-	-	-
201	—	Polyazo	Dark Brown	SDC	-	1	3	-	-	-	-	-	-
206	25010	Disazo	Brown	SDC	-	-	3	-	-	-	-	-	-
213	—	Azo	Brown	VESLIC	-	-	2-3	-	-	-	-	-	-
214	—	Trisazo	Red. Brown	FBy	5	1	3	-	-	-	-	-	-
217	—	Azo		Roum	4	-	4	-	-	-	-	-	-
Black 4	30245	Trisazo	Black	SLTC	-	3	3	-	-	-	3-4	-	-
5	—	Polyazo	Black	SDC	-	1	4	-	-	-	-	-	-

Leather Dyes—Direct Black 14—120

C.I. Direct Black	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
14	30345	Trisazo		VESLIC	—	—	1-2	—	—	—	—	—	—
15	22620	Disazo											
17	27700	Disazo											
18	—	—	Bluish Black	SLTC	—	3	4	4-5	—	3-4	4	—	4-5
19	35255	Polyazo											
22	35435	Polyazo											
33	—	Trisazo	Green. Black	SDC	—	1	3	—	—	—	—	—	—
34	35075	Polyazo											
38	30235	Trisazo											
41	30260	Trisazo	Black	FBy	5	1	2	—	—	—	—	—	—
42	—	—	Bluish Grey	SDC	—	1	3	—	—	—	—	—	—
51	27720	Disazo		SDC	—	1	—	—	—	—	—	—	—
62	—	Stilb. (Polyazo)		VESLIC	—	—	5-6	—	—	—	—	—	—
65	—	—		SDC	—	—	1	—	—	—	—	—	—
67	—	Trisazo	Grey	SLTC	2	2	5	—	—	—	—	—	—
78	30015	Trisazo											
80	31600	Trisazo											
91	30400	Trisazo		SLTC	—	—	3	—	—	—	4	—	—
94	—	—											
97	35810	Polyazo											
118	—	Azo											
119	—	Polyazo	Black	SDC	—	—	3	—	—	—	—	—	—
120	—	Trisazo	Black	SDC	—	—	3	—	—	—	—	—	—

NOTES

Leather Dyes—C.I. Mordant Yellow 1—60, Orange 1—44, Red 7—64

C.I. Mordant Yellow	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
1	14025	Monoazo	Green Yellow	SDC	—	2	3	—	—	—	—	—	—
3	14095	Monoazo											
5	14130	Monoazo		SDC	—	4	6	—	—	—	—	—	—
8	18821	Monoazo		SDC	—	5	4	—	—	—	—	—	—
10	14010	Monoazo		SDC	—	3	5	—	—	—	—	—	—
12	14045	Monoazo		SDC	—	1	4	—	—	—	—	—	—
14	14055	Monoazo											
16	25100	Disazo		SDC	—	1-2	3	—	—	—	—	—	—
18	13990	Monoazo		SDC	—	2	4	—	—	—	—	—	—
20	14110	Monoazo		SDC	—	5	6	—	—	—	—	—	—
26	22880	Disazo											
29	—	Monoazo											
34	—	—	Green Yellow	VESLIC	—	5	3-4	5	1	1	4	4	4
36	14135	Monoazo											
44	14115	Monoazo											
49	—	—		VESLIC	—	4-5	3-4	—	—	—	4	4-5	4-5
60	14058	Monoazo		Pol	—	5	5	—	—	—	4	—	—
Orange													
1	14030	Monoazo	Orange	SDC	—	3-4	3-4	—	—	—	—	—	—
4	18940	Monoazo											
6	26520	Disazo		SLTC	3	3	6	2	2	2	4	3	4
10	26560	Disazo											
30	—	Disazo											
34	—	Pyrazolone											
44	—	—		VESLIC	—	3	4-5	—	—	—	5	3	4
Red													
7	18760	Monoazo		SDC	—	3-4	2	—	—	—	—	—	—
8	23095	Disazo											
9	16105	Monoazo		VESLIC	—	3	3-4	—	—	—	3	3	4
14	—	Monoazo		SDC	—	2	2	—	—	—	—	—	—
19	18735	Monoazo		SDC	—	3	4	—	—	—	—	—	—
23	—	Azo		SDC	—	2	5	—	—	—	—	—	—
37	—	Azo		VESLIC	—	4	3-4	—	—	—	3	3-4	4
64	—	Monoazo											

Leather Dyes—C.I. Mordant Violet 1—54, Blue 1—49, Green 15—43, Brown 1—48

C.I. Mordant Violet	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER																		
						Pene- tration	Light	Perspiration			Washing													
								Alt.	Co.	Wo.	Alt.	Co.	Wo.											
1	43565	TPM		VESLIC	-	3	2-3	-	-	-	4	5	5											
4	14760	Monoazo		SDC	-	3	4	-	-	-	-	-	-											
5	15670	Monoazo		SDC	-	4	3	-	-	-	-	-	-											
8	43515	TPM		SDC	-	3	3	-	-	-	-	-	-											
14	—	Azo		SDC	-	3	4	-	-	-	-	-	-											
28	43570	TPM		VESLIC	-	3	2	-	-	-	4	5	5											
54	51040	Oxazine		SDC	-	2	3	-	-	-	-	-	-											
Blue																								
1	43830	TPM		SDC	-	3	3-4	-	-	-	-	-	-											
3	43820	TPM		SDC	-	2	3	-	-	-	-	-	-											
7	17940	Monoazo		SDC	-	1	4	-	-	-	-	-	-											
32	58605	Anthraquinone		VESLIC	-	3	3-4	-	-	-	2	4-5	5											
49	—	Azo			-	1	1	-	-	-	-	-	-											
Green																								
15	26925	Disazo	SDC	-	1	1	-	-	-	-	-	-												
22	45510	Xanthene		SLTC	3	2	3-4	-	-	-	4-5	3	4-5											
42	—	Disazo																						
43	—	Monoazo																						
Brown																								
1	20110	Disazo												Dark Brown										
6	11875	Monoazo	Brown	SDC	-	2	3	-	-	-	-	-	-											
8	—	—		SLTC	5	2	4	2	2	2	4	3-4	4											
12	11290	Monoazo		SDC	-	3	2	-	-	-	-	-	-											
15	14870	Monoazo			SDC	-	1	4	-	-	-	-	-	-										
18	20150	Disazo																						
19	14250	Monoazo																						
22	14235	Monoazo																						
24	11880	Monoazo																						
29	—	Disazo																						
30	13230	Monoazo	Red Brown	VESLIC	-	2	3	5	3	3	3-4	2-3	4											
31	—	Monoazo																						
33	13250	Monoazo												VESLIC	-	5	3	5	1	1	3	4	4-5	
39	—	Azo												VESLIC	-	4-5	3	-	-	-	3	3	3	
48	11300	Monoazo												SDC	-	4	3	-	-	-	-	-	-	

Leather Dyes—C.I. Mordant Brown 57—79, Black 1—68

C.I. Mordant Brown	C.I. Constitution Number	Chemical Class	Hue on Full Chrome Leather	Test Method	Solubility Rating	PROPERTIES ON FULL CHROME LEATHER							
						Pene- tration	Light	Perspiration			Washing		
								Alt.	Co.	Wo.	Alt.	Co.	Wo.
57	—	Azo	Red Brown	VESLIC	—	2	3	5	1	1	4	2	4
70	13265 (similar)	Monoazo											
79	—	—											
Black													
1	15710	Monoazo		SDC	—	1	5	—	—	—	—	—	—
3	14640	Monoazo		SDC	—	2	5	—	—	—	—	—	—
5	26695	Disazo		SDC	—	1	4	—	—	—	—	—	—
7	16505	Monoazo		SDC	—	1	5	—	—	—	—	—	—
9	16500	Monoazo		SDC	—	2	5	—	—	—	—	—	—
10	21720	Disazo											
13	63615	Anthraquinone		SDC	—	3	—	—	—	—	—	—	—
15	15690	Monoazo		SDC	—	3	4	—	—	—	—	—	—
17	15705	Monoazo		SDC	—	2	4	—	—	—	—	—	—
26	—	Azo											
38	18160	Monoazo		SDC	—	1	4	—	—	—	—		—
56	16710	Monoazo											
68	26751	Disazo											

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